

Reg. No. 41732

Shelf No. Ref



White Fund.

x
17
BIRDS

AND

ALL NATURE



A MONTHLY SERIAL

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOLUME IV.

CHICAGO AND NEW YORK.
NATURE STUDY PUBLISHING COMPANY

COPYRIGHT, 1898

BY

NATURE STUDY PUBLISHING CO
CHICAGO.

Reg. No. 41,732
Ref

INTRODUCTION.



As heretofore announced, beginning with the present, each number of BIRDS AND ALL NATURE will present at least two birds, three or four animals, and the remaining plates will depict such natural subjects as insects, butterflies, flowers, geological specimens, etc. In fact, everything in nature which can be brought before the camera will in its due course be portrayed.

BIRDS is without doubt one of the most popular magazines ever presented to the American public. It is read and admired by over one hundred thousand persons.

BIRDS AND ALL NATURE promises to be even more popular, if possible, than BIRDS. We are constantly receiving congratulations on the success of our enterprise, and people are delighted to learn that we shall include in succeeding numbers all interesting branches of natural history. When the bound volume appears it will prove to be worthy of its predecessors.

Nature Study Publishing Company.

SQUIRREL TOWN.

Where the oak trees tall and stately
Stretch great branches to the sky
Where the green leaves toss and flutter
As the summer days go by,
Dwell a crowd of little people,
Ever racing up and down,
Bright eyes glancing, gray tails whisking ;
This is known as Squirrel Town.

Bless me, what a rush and bustle,
As the happy hours speed by !
Chatter, chatter—chatter, chitter,
Underneath the azure sky.
Laughs the brook to hear the clamor ;
Chirps the Sparrow, gay and brown
“ Welcome! Welcome, everybody!
Jolly place, this Squirrel Town.”

Honey-bees the fields are roaming ;
Daisies nod and lilies blow ;
Soon Jack Frost—the saucy fellow—
Hurrying, will come, I know.
Crimson leaves will light the woodland ;
And the nuts come pattering down.
Winter store they all must gather—
Busy place, then, Squirrel Town.

Blowing, blustering, sweeps the north wind—
See! the snow is flying fast.
Hushed the brook and hushed the Sparrow,
For the summer time is past.
Yet these merry little fellows
Do not fear old Winter's frown ;
Snug in hollow trees they're hiding.
Quiet place is Squirrel Town.

—ALIX THORN.



BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IV.

JULY, 1898.

No. 1.

WILSON'S SNIPE.

WILSON'S SNIPE, otherwise known as the English Snipe, Jacksnipe, and Guttersnipe, and which is one of our best known game birds, has a very extended range; indeed, covering the whole of North America, and migrating south in the winter to the West Indies and northern South America. Its long, compressed, flattened, and slightly expanded bill gives it an odd appearance, and renders it easily recognizable. From March till September the peculiar and cheerful "*cheep*" of the Snipe may be heard in the larger city parks where there are small lakes and open moist grounds, and where it can feed and probe with its long, soft, sensitive, pointed bill in the thin mud and soft earth for worms, larvae, and the tender roots of plants. In some localities in the Southern states, during the winter months, thousands of Snipe are killed on the marshes where they collect on some especially good feeding ground. We have rarely seen more than two together, as they are not social, moving about either alone or in pairs. Its movements on the ground are graceful and easy, and, while feeding, the tail is carried partly erect, the head downward, the bill barely clearing the ground. We recently watched one through an opera glass, but the frequency of its changes from point to point and the rapidity of its flight discouraged long observation. The

flight is swift, and, at the start, in a zigzag manner. Sportsmen say it is a most difficult bird to shoot, requiring a quick eye and a snap shot to bag four out of five. Col. Goss said that he always had the best success when the birds were suddenly flushed, in shooting the instant its startled "*scaipe*" reached his ear, "as it is invariably heard the moment the bird is fairly in the air."

It is entertaining to watch the courtship of these birds, "as the male struts with drooping wings and wide spread tail around his mate in the most captivating manner, often at such times rising spiral-like with quickly beating wings high in the air, dropping back in a wavy, graceful circle, uttering at the same time his jarring, cackling love note, which, with the vibration of the wings upon the air, makes a rather pleasing sound.

The snipe's nest is usually placed on or under a tuft of grass, and is a mere depression, scantily lined with bits of old grass and leaves. The eggs are three or four, greyish olive, with more or less of a brownish shade, spotted and blotched chiefly about the larger end with varying shades of umber brown.

If you want to identify Wilson's Snipe, have with you a copy of this number of BIRDS AND ALL NATURE as you stroll along shore or beach. Our picture is his very image.

THE BLACK WOLF.

Some of my little readers have probably heard about the small boy who thought it rare fun to frighten his friends by crying "Wolf! Wolf!" as though he were being pursued. They lived in a wild part of the country where Wolves were frequently seen, but in time they grew used to Johnnie's little joke, so that one day when he cried "Wolf! Wolf!" in frantic tones they paid no attention to him. Alas! that day a Wolf really did sneak out of the woods—a hungry Wolf—and poor little Johnnie furnished him a very satisfactory meal. There is a deep meaning attached to this fable, which you had best ask your teacher to explain.

Well, the Black Wolf, whose picture we present is a fierce looking fellow indeed. We have heard so many stories about Wolves attacking travelers and their horses that we have thought them full of ferocity and courage, when in fact they are the most cowardly of all our animals. Unless pressed by extreme hunger they never attack animals larger than themselves, and then only in packs. A cur dog, as a rule, can drive

the largest wolf on the plains. Lean, gaunt, and hungry looking, they are the essence of meanness and treachery. Their long, bushy tails are carried straight out behind, but when the animal is frightened, he puts his tail between his legs just like the common dog.

There are men who make it a business to go Wolf hunting in order to secure their "pelts," or hides. The bait they use is the carcass of some animal, elk, deer, or coon, which they impregnate with poison, and leave in a place which will do the most good. In the morning sometimes as many as fifty dead Wolves will be found scattered about the carcass whose flesh they had so ravenously devoured. A Wolf skin is worth about one dollar and a half, so that it pays a hunter very well to "catch" a number of these mean animals.

They are sometimes hunted on horseback with hounds, but they can run with such speed when frightened, that no ordinary dog can keep up with them. Among the pack are one or more greyhounds, who bring the wolf to bay and allow the other dogs to come up.



THE BLACK WOLF.

AT one time the Black Wolf of America was considered by naturalists to be only a variety of the common Wolf; but it is now believed to be a distinct species, not only by reason of the color of its fur but from differences of stature, the position of the eye, the peculiar bushiness of the hair and other evidence entitling it to rank as a separate species. This variety is referred to as an inhabitant of Florida, and is described as partaking of the general lupine character, being fierce, dangerous, and at the same time cowardly and pusillanimous, when they find themselves fairly enclosed. If imprisoned in even a large space, they crouch timidly in the corners, and do not venture to attack man when he enters the cage. Audubon mentions a curious instance of this strange timidity in a ferocious nature, of which he was an eye-witness: "A farmer had suffered greatly from Wolves, and determined to take revenge by means of pitfalls, of which he had dug several within easy reach of his residence. They were eight feet in depth and wider at the bottom than at the top. Into one of these traps three fine Wolves had fallen, two of them black, and the other a brindled animal. To the very great astonishment of Mr. Audubon, the farmer got into the pit, pulled out the hind legs of the Wolves, as they lay trembling at the bottom, and with his knife severed the chief tendon of the hind limbs, so as to prevent their escape. The skins of the captured animals were sufficiently valuable to reimburse the farmer for his labor and his previous losses."

The Esquimaux use traps made of large blocks of ice, constructed in the same manner as our ordinary mouse-

trap with a drop-door. The trap is made so narrow that the Wolf cannot turn himself, and when he is closed in by the treacherous door, he is put to death by spears.

Wood says that when Wolves and Dogs are domesticated in the same residence a mutual attachment will often spring up between them, although they naturally bear the bitterest hatred to each other. A mixed offspring is sometimes the result of this curious friendship, and it is said that these half-breed animals are more powerful and courageous than the ordinary Dog. Mr. Palliser possessed a fine animal of this kind, the father of which was a White Wolf and the mother an ordinary Indian Dog. It is a well-known fact that the Esquimaux are constantly in the habit of crossing their sledge Dogs with Wolves in order to impart strength and stamina to the breed. Indeed they are so closely related to Wolves that there can be no question that they are descended from them.

The Wolf produces from three to nine young in a litter. In January the mother Wolf begins to prepare her habitation, a task in which she is protected or assisted by her mate, who has won her in a fair fight from his many rivals. He attaches himself solely to one mate, and never leaves her till the young Wolves are able to shift for themselves. The den in which the young cubs are born is warmly lined with fur which she pulls from her own body. The cubs are born in March and remain under her protection seven or eight months. They begin to eat animal food in four weeks after birth.

The Wolf's whelp will at last a Wolf become
Though from his birth he find with man a home.

Arabian Proverb.

AN ARMADILLO AS A PET.

NURSE McCULLY of the Royal infirmary, Liverpool, has an Armadillo as a pet. This little animal, which is a native of South America, was given to the nurse by a sailor when it was quite a baby, weighing only three pounds. It was most advantageously reared on peptonized milk,—ordinary cow's milk being too strong,—and the little creature now weighs 11 pounds. Its present diet is peculiar, consisting of bread and milk, bacon, apples, and sardines. Also, it supports its adopted

country by eating English tomatoes, but rejecting American ones. It sleeps all day, rising at 6 p. m. and running all over the ward. Its chief amusement seems to be tearing to pieces the patients' slippers. It knows its mistress, and will readily come to her. The little Armadillo sleeps in a warm barrel, furnished with bran and flannel. It has now been at the Royal infirmary for about four years.—*Strand Magazine*.

AFRICAN FOLK LORE.

AFRICAN LITERATURE is very rich in fables of animals, which may be divided into the two categories of moral apologues and simple narrations. In the former such an identity is noticeable with stories of the peoples of Asia and Europe as almost to cause us to think that both proceed from a common source whence they were drawn in prehistoric times. To this may, however, be opposed the hypothesis of an original and simultaneous origin in different places; a question for the discussion of which we have not yet all the elements. One of the most brilliant of the African apologues comes from Somaliland, and is perhaps better than the corresponding Euro-

pean fable: "The Lion, the Hyena, and the Fox went hunting, and caught a Sheep. The Lion said, 'Let us divide the prey.' The Hyena said, 'I will take the hinder parts, the Lion the fore parts, and the Fox can have the feet and entrails.' Then the Lion struck the the Hyena on the head so hard that one of its eyes fell out, then turned to the Fox and said, 'Now you divide it.' 'The head, the intestines, and the feet are for the Hyena and me; all the rest belongs to the Lion.' 'Who taught you to judge in that way?' asked the Lion. The Fox answered, 'The Hyena's eye.'"—*Popular Science Monthly*.



From col. F. M. Woodruff

RED SQUIRREL.
2a. Life-size.

Copyright by
Nature Study Pub. Co., 1898, Chicago

THE RED SQUIRREL.

HICKAREE is the common name of the Red Squirrel, so called from the cry which it utters. It is one of the most interesting of the family, and a pleasing feature of rural life. During the last weeks of autumn the Squirrel seems to be quite in its element, paying frequent visits to the nut trees and examining their fruit with a critical eye, in anticipation of laying up a goodly store of food for the long and dreary months of winter; as they do not, as was formerly asserted, hibernate, but live upon the stores they secure. A scarcity may mean much suffering to them, while an abundance will mean plenty and comfort. In filling their little granaries, they detect every worm-eaten or defective nut, and select only the soundest fruit, conveying it, one by one, to its secret home. Feeding abundantly on the rich products of a fruitful season, the Squirrel becomes very fat before the commencement of winter, and is then in its greatest beauty, the new fur having settled upon the body, and the new hair having covered the tail with its plumy fringe.

Did you ever watch a squirrel open and eat the contents of a nut? It is very curious and interesting. The little fellow takes it daintily in his fore-paws, seats himself deliberately, and then carrying the nut to his mouth, clips off the tips with his sharp chisel-edged incisor teeth. He then rapidly breaks away the shell, and after peeling the husk from the kernel, eats it complacently, all the while furtively glancing about him, ever

in readiness to vanish from his post at any suspicious disturbance. The food of the Squirrel is not vegetable substances. Young birds, eggs, and various insects constitute a part of his food. He has the destructive habit of nibbling green and tender shoots that sprout upon the topmost boughs, thus stunting the growth of many a promising tree. He visits the farmers' corn-cribs, too, and thus renders himself somewhat obnoxious. All in all, however, he has his uses, and should not be wholly exterminated. Tender and juicy, he has always paid for his apparent despoliation, and his destruction of much injurious insect life rather favors his protection.

The Squirrel is a variable animal in point of color, the tint of its fur changing with the country it inhabits. It is easily tamed, and is a favorite domestic pet. It is said, however, that one should beware of purchasing so-called tame Squirrels, as they are often drugged with strychnine, under whose influence they will permit themselves to be handled. In some cases the incisor teeth are drawn, to prevent them from biting. It is sad that such cruel tricks of the vendors exist and cannot be prevented.

It is related that about 1840, during a season of great scarcity of mast, vast multitudes of Squirrels migrated from the eastern states to Canada, where food conditions were more favorable. They crossed the country in armies, swam rivers with their tails curled over their backs, sailing before the wind. It was a curious instance of rare instinct and self-preservation.

SECRETS OF AN OLD GARDEN.

THIS garden had some small fruit trees thickly covered with leaves, and a tangle of currant bushes and raspberry vines, as well as neatly worked rows of vegetables. There was also a thick clump of tall, feathery grass beside the paling.

It was well it had these small places of refuge, for it had many perils. Two cats, a white and a gray, patrolled the garden with silent and velvety tread; boys, who were not silent, used all kinds of small but deadly weapons on the street that ran beside it, and great heavy wagons rumbled up and down all day, making a great noise and dust.

But how many birds I have seen and heard there! Red-headed Woodpeckers tapped and called early in the morning on the tall telegraph pole at the corner, and flocks of Grackles, the Bronze, the Purple, and the Rusty Grackles, were fed from the fresh-turned earth. A Catbird hopped lightly in the shadow of the tool-house, and I suspect some Robins of foraging turn with their young families. Sparrows of all kinds dwelt there—flocks of yellow Ground Sparrows, Brown and Gray Sparrows, Clipping Sparrows. I saw one day the funniest Clipping baby with his chestnut cap pushed up into a regular crown almost too big for his

tiny head, and the brightest black eyes peering at me, as he stood on a clod of earth. Flocks, also, of Goldfinches, glittering like small balls of gold, and Indigo Buntings, blue as the sky, held merry-makings there, and oh, the songs from morning until night! A Warbling Vireo sang so loud and so splendidly that we thought he must be some big bird of scarlet plumage instead of the wee wood-sprite he was; and little Wrens and little Indigo Birds fairly bubbled over with songs of joy.

The nests, the hidden nests, were the old garden's secrets, and the garden kept them well. There was a flutter of wings, the bird floated down, and was straightway invisible. Not the tip of a tail or beak was to be seen. Or up flew the bird and was as quickly lost in the thick screen of interwoven leaves overhead. There were certain gray birds so much the color of the dead wood on which they perched that they might have nested in full, open view, and yet have remained unseen until they moved. How the little birds did love this garden—the noisy street on one side, the close, dingy houses on the other, and how near its heart did the old garden keep the birds.

So many and such different birds—yet “not one of them is forgotten before God.”—ELLA F. MOSBY.

BIRDS FORTELL MARRIAGE.

Some of the Prussian girls have an odd way of finding out which of a number will be married first. The girls take some corn and make a small heap of it on the floor, and in it conceal one of their finger rings. A

chicken is then introduced and let loose beside the little heaps of corn. Presently the bird begins to eat the grain, and whichever ring is first exposed the owner of it will be the first to marry.

THE PRAIRIE HEN.

NUTTALL says that, choosing particular districts for residence, this species of Grouse is far less common than its Ruffed relative. It is often called Prairie Chicken and Pinnated Grouse. Confined to dry, barren, and bushy tracts of small extent, these birds are in many places now wholly or nearly exterminated. They are still met with on the Grouse plains of New Jersey, on Long Island, in parts of Connecticut, and in the Island of Martha's Vineyard. Mr. Nuttall was informed that they were so common on the ancient bushy site of the city of Boston that laboring people or servants stipulated with their employers not to have the Heath Hen brought to table oftener than a few times in the week. They are still common in the western states, but thirty years ago we saw vast numbers of them on the plains of Kansas. As there were no railroads then, they could not be sent to market, and were only occasionally eaten by the inhabitants. The immense wheat fields which have been sown for a number of years past have largely increased this species, where they assemble in flocks, and are the gleaners of the harvest.

Early in the morning Grouse may be seen flying everywhere, from one alone to perhaps a thousand together. They alight in the cornfields. "Look! Yonder comes a dozen; they will fly right over you; no, they swerve fifty yards to one side and pass you like bullets; single out your bird, hold four feet in front of him, and when he is barely opposite cut loose. Following the crack of the gun you hear a sharp whack as the shot strike, and you have tumbled an old cock into the grass. You have of course marked down as many of the birds as possible;

let them feed an hour and then drive them up. They will rise very wild, and the only object in flushing them is to see them down where they will take their noon-day siesta."

On the prairies they are often shot from a wagon, the hunter remaining seated, so plentiful are they in remote districts. Near the towns very few are seen. The birds always seem to prefer the low ground in a field. They are rarely seen during the middle of the day, as they do not move about much. It is a fine sight to see a large flock of chickens rise on the wing and fly swiftly and steadily for several hundred yards. When they drop in the grass they separate and run in every direction. Like the Quail, in the inclemency of winter they approach the barn, "basking and perching on the fences, occasionally venturing to mix with the poultry in their repast, and are then often taken in traps." They feed on buds and mast, sometimes leaves and the buds of the pine. In wintry storms they seek shelter in the evergreens, but in spring and summer they often roost on the ground in company. These birds begin pairing in March or April. Mr. Nuttall's account of this interesting period (see his *Hand-book of Ornithology*—Little, Brown & Co.)—is as follows: "At this time the behavior of the male becomes remarkable. Early in the morning he comes forth from his bushy roost and struts about with a curving neck, raising his ruff, expanding his tail like a fan, and seeming to mimic the ostentation of the Turkey. He now seeks out or meets his rival, and several pairs at a time, as soon as they become visible through the dusky dawn, are seen preparing for combat. Previously to this encounter, the male, swelling out his throat, utters what is called a toot-

ing—a ventriloquial humming call to the female three times repeated, and though uttered in so low a key, it may yet be heard three or four miles on a still morning. About the close of March on the plains of Missouri we heard this species of Grouse tooting or humming in all directions, so that at a distance the sound might be taken almost for the grunting of the Bison or the loud croak of the Bull-frog. While uttering his vehement call the male expands his neck pouches to such a magnitude as almost to conceal his head, and blowing, utters a low drumming bellow like the sound of *k-tom-boo! k-tom-boo!* once or twice repeated, after which is heard a sort of guttural squeaking crow or *koak, koak, koak*. In the intervals of feeding we sometimes hear the male also cackling, or, as it were, crowing like *ko, ko, koop, koop!* While engaged in fighting with each other, the males are heard to utter a

rapid, petulant cackle, something in sound like excessive laughter. The tooting is heard from day-break till eight or nine o'clock in the morning. As they frequently assemble at these *scratching places*, as they are called, ambuscades of bushes are formed around them, and many are shot from these covers."

The nest is placed on the ground in the thick prairie grass, and at the foot of bushes on the barren ground; a hollow is scratched in the soil, and sparingly lined with grass and feathers. The nest is so well concealed that it is not often discovered. The eggs are from ten to twelve, and of a plain brownish color. The female alone protects and attends the young, brooding them under her wings in the manner of the domestic fowl. The affectionate parent and her brood keep together throughout the season.

ABOUT THE SONGSTERS.

NEW NEIGHBORS.—“I see they are building a two-story house in our back yard,” said papa.

“O papa, that won’t be nice!” said Marjorie. “People will look right into our windows!”

“Yes,” said papa; “one of the builders was sitting on my window-sill this morning; but when he saw me he flew away.”

“Oh, you mean a bird!” cried Nan.

BLUE-JAY ON A SPREE.—“Naw, sir, I ran him down. He’s drunk on madberry. I didn’t shoot him,” so said our little stable-boy, John Henry. We examined the beautiful Blue-jay.

It was lying in the boy’s hand, with a sort of contented *dolce far niente* expression on its face. Its saucy eyes were elated and fearless. Its head wagged ridiculously in the effort to hold it up. It was a common North American drunk, nothing less. The bird was intoxicated on the berries of the Pride of China, known throughout the south as the poison or mad-berry.

In Florida thousands of respectable Northern Robins, that would blush to do it at home, are found lying about in the state of grossest drunkenness from the same cause. We wondered if some blue-ribbon society might not be profitably started among these poor birds. But they do not know any better.

We have this advantage over them, we know the mad-berry when we see it. It is to our disgrace if we do not let it alone.

SERVES AS WATCHMAN AND WAKES THE FAMILY.—A Mocking Bird serves as a night watchman at the residence of R. F. Bettes, at Tampa, Fla., and notifies the family of the coming of dawn every morning by pecking on the window pane. Often when the

doors are left ajar the Mocking Bird comes inside and perches on the chairs and about the room. It will allow the family to come very close and shows marked attention to Mrs. Bettes and her little daughter. When they start out for a visit it follows them some distance, and then returns to the yard. When the family returns it appears very glad and will fly all about them, and gives evidence of its joy in other ways. The children feed it about the house, and when the family meal is to be served, if the window is not raised, it makes its presence known by pecking on the window. During the day it gets on a neighboring brush or tree and sings its roundelay of song for hours at a time.

A WONDERFUL CANARY. — Mrs. Willet C. Durland, of Union Hall street, Jamaica, is the owner of a Canary possessing extraordinary vocal powers. It never tires of singing, and was the admiration of all who heard it, until eight months ago, when it suddenly, and for no apparent reason, became absolutely silent, uttering scarcely a chirrup for days at a time. Mrs. Durland at last tired of keeping a Canary that did not sing, and, finding a young Chippie bird on the lawn, one day, she put it in the cage and let the Canary go. About sundown that evening, the Canary returned and hopped about on the window sill, evidently making a plea to be received back into the family. This was too much for Mrs. Durland. She put the little creature back in its cage, and the next morning the household was awakened by a flood of joyous song. The Canary has been singing ever since, and the Durlands are sure it considers being set free a punishment for its long silence, and is now trying to make amends.

THE BUTTERFLY TRADE.

THERE are probably hundreds, if not thousands, of butterfly collectors in this country, says the Boston Transcript. But it is doubtful if there are many who gain their livelihood in this way, as is done by the four Denton brothers of Wellesley, who have among them one of the finest, and certainly one of the most beautiful collections in the world, comprising specimens from India, China, South America, and many other distant countries.

Large and fine as their collection is, however, it contains only a small part of the butterflies that they have collected, as almost all of them are sold to museums, and collectors, or simply as house ornaments, for as they mount them, they are objects of great beauty and are preserved in such a way as to give every opportunity for the display of their fine points, while they will last for an indefinite number of years.

They began this work in the usual amateur manner, and simply for their own amusement, but instead of becoming tired of it and dropping it, as is the case with most amateur collectors, they became more and more interested, and their methods attracted so much attention and interest in outsiders that they finally found it advisable to adopt this as their life work. How extensive a business it is may be judged from the fact that they have found it profitable to make a journey of six months to South America for the purpose of increasing the size of their collection, and that they have in India, China, and several other parts of the world agents who collect for them and ship the butterflies to them here.

The work of preparing the butterflies for sale and exhibition is all done in a small building back of their house on Washington street at Wellesley, and keeps them busy nearly all the

time that they are not collecting. When the butterflies are sent or brought in, each is in a small paper folder, which protects it from friction or breakage. The insects are laid with their wings together and pressed, being then put into the folder, and shipped in small boxes, enough being put into each box to prevent them from slipping about. In this way the insects arrive in very good condition, although they are, of course, very dry and brittle if they have come a long distance. In order to get rid of this dryness, which would make it impossible to work on them, they are put into a box with a lot of wet paper, and the dampness from this soon saturates them and makes them soft again and easily shaped. The next part of the work is in repairing what damage they have sustained, for, of course, in spite of the care of shipping, they are not as perfect as before they were caught, and there is a great deal of delicate work on them before they are ready for exhibition or sale.

Mounted, a drawer full of butterflies is more beautiful than a collection of precious gems, for, although many of our native butterflies are exceedingly beautiful, they are not to be compared with the average of those from India, China, and South America. In these dead, heavy black alternates with brilliant crimson, yellow, and gold, livid greens and blues, and deep, rich garnet and purple, sometimes in broad bands and blotches of glowing color, and in others in wonderfully delicate and intricate traceries and patterns. The texture of the wings is also infinitely more beautiful than anything we have here, some of them having a heavy rich gloss that exceeds that on the finest fabric that human skill can produce, while others have the deep changing lustre of gems or liquids.

THE PASSENGER PIGEON IN WISCONSIN AND NEBRASKA.

[See Vol. III, p. 23.]

UR records of this species during the past few years have referred, in most instances, to very small flocks and generally to pairs or individuals. In *The Auk* for July, 1897, I recorded a flock of some fifty Pigeons from southern Missouri, but such a number has been very unusual. It is now very gratifying to be able to record still larger numbers, and I am indebted to Mr. A. Fugleberg of Oshkosh, Wis., for the following letter of information under date of Sept. 1, 1897: "I live on the west shore of Lake Winnebago, Wis. About six o'clock on the morning of August 14th, 1897, I saw a flock of Wild Pigeons flying over the bay from Fisherman's Point to Stony Beach, and I assure you it reminded me of old times, from 1855 to 1880, when Pigeons were plentiful every day. So I dropped my work and stood watching them. This flock was followed by six more flocks, each containing about thirty-five to eighty Pigeons, except the last which only contained seven. All these flocks passed over within half an hour. One flock of some fifty birds flew within gun shot of me, the others all the way from one hundred to three hundred yards from where I stood." Mr. Fugleberg is an old hunter and has had much experience with the Wild Pigeon. In a later letter dated Sept. 4, 1897, he writes: "On Sept. 2, 1897, I was hunting Prairie Chickens near Lake Butte des Morts, Wis., where I met a friend who told me that a few days previous he had seen a flock of some twenty-five Wild Pigeons and that they were the first he had seen for years."—This would appear as though these birds

were instinctively working back to their old haunts, as the Winnebago region was once a favorite locality. We hope that Wisconsin will follow Michigan in making a close season on Wild Pigeons for ten years, and thus give them a chance to multiply and perhaps regain, in a measure, their former abundance.

In *Forest and Stream*, of Sept. 25, 1897, is a short notice of 'Wild Pigeons in Nebraska,' by 'W. F. R.' Through the kindness of the editor he placed me in correspondence with the observer, W. F. Rightmire, to whom I am indebted for the following details given in his letter of Nov. 5, 1897: "I was driving along the highway north of Cook, Johnson County, Neb., on August 17, 1897. I came to the timber skirting the head stream of the Nemaha River, a tract of some forty acres of woodland lying along the course of the stream, upon both banks of the same, and there, feeding on the ground or perched upon the trees were the Passenger Pigeons I wrote the note about. The flock contained seventy-five to one hundred birds. I did not frighten them, but as I drove along the road, the feeding birds flew up and joined the others, and as soon as I had passed by they returned to the ground and continued feeding. While I revisited the same locality, I failed to find the Pigeons. I am a native of Tompkins County, N. Y., and have often killed Wild Pigeons in their flights while a boy on the farm, helped to net them, and have hunted them in Pennsylvania, so that I readily knew the birds in question the moment I saw them."

—RUTHVEN DEANE in April *Auk*.

THE AMERICAN RABBIT.

COTTONTAIL, and Molly Cottontail are the names commonly applied to this easily recognized species of the Rabbit family, everywhere prevalent in the middle states, continuing to be numerous in spite of the fact that it is constantly hunted in season for food. Its flesh is more delicate than that of the larger species, and is much valued. In winter the city markets are well supplied with Cottontails, their increase being so large that they are always abundant, while in rural districts the small boys capture them in great numbers with dogs. We have known two hundred of these innocent creatures to be taken in one day on a single farm. If protected for but one season they would become as Rabbits are in Australia, a pest.

Rabbits live in burrows, which are irregular in construction and often communicate with each other. From many of its foes the Rabbit escapes by diving into its burrow, but there are some animals, as the Weasel and Ferret, which follow it into its subterranean home and slay it. Dogs, especially those of the small terrier breeds, will often force their way into the burrows, where they have sometimes paid the penalty of their lives for their boldness. The Rabbit has been seen to watch a terrier dog go into its burrow, and then fill up the entrance so effectually that the invader has not been able to retrace his steps, and has perished miserably in the subterranean tomb.

When the female Rabbit is about to begin to rear a family, she quits the ordinary burrows and digs a special tunnel in which to shelter the young family during the first few weeks of life. At the extremity of the burrow she places a large quantity of dried herbage

mingled with down from her own body, with which to make a soft and warm bed for the little ones. These are about seven or eight in number, and are born without hair and with closed eyes, which they are only able to open after ten or twelve days.

When domesticated the female Rabbit will often devour her young, a practice which has been considered incurable. This propensity has, however, been accounted for by natural causes. It has been the custom to deprive pet Rabbits of water on the the ridiculous plea that in a wild state they do not drink, obtaining sufficient moisture from the green herbs and grasses which constitute their food, but in the open country they always feed while the dew lies upon every blade, which of course is never the case with green food with which domestic Rabbits are supplied. Thus have these poor innocents been the victims of ignorance.

Rabbits are great depredators in fields, gardens, and plantations, destroying in very wantonness hundreds of plants which they do not care to eat. They do great damage to young trees, stripping them of their tender bark, as far up as they can reach while standing on their hind feet. Sometimes they eat the bark, but in many cases they leave it in heaps upon the ground, having chiseled it from the tree merely for the sake of exercising their teeth and keeping them in good order.

It is true that most Rabbits burrow in the ground, their burrows having many devious ramifications, but the Cottontail usually makes his home in a little dug-out, concealed under a bush or a tuft of grass. We remember one of these little excavations which we found in a cemetery concealed by the overhanging branches of a rosebush at

(Continued on page 29.)

the foot of a grave. While reading the inscription on the tombstone we were startled by a quick rush from the bush, and discovering the nest, in which there were five tiny young with wide open eyes, we took them up tenderly and carried them home. We too, were young then. Admonished that we had cruelly deprived a mother of her offspring, and that our duty was

to return them to her, we unwillingly obeyed, and put them back in the little cavern. They huddled together once more and no doubt were soon welcomed by their parents.

A frosty Saturday morning, a light snow covering the ground, a common cur dog, Cottontail tracks, and a small, happy boy. Do you not see yourself as in a vision?

THIRTY MILES FOR AN ACORN.

Far away I hear a drumming—
Tap, tap, tap!
Can the Woodpecker be coming
After sap?

DOWN in Mexico there lives a Woodpecker who stores his nuts and acorns in the hollow stalks of the yuccas and magueys.

These hollow stalks are separated by joints into several cavities, and the sagacious bird has somehow found this out, and bores a hole at the upper end of each joint and another at the lower, through which to extract the acorns when wanted. Then it fills up the stalks solidly and leaves its stores there until needed, safe from the depredations of any thievish bird or four-footed animal.

The first place in which this curious habit was observed was on a hill in the midst of a desert. The hill was covered with yuccas and magueys, but the nearest oak trees were thirty miles away, and so it was calculated, these industrious birds had to make a flight of sixty miles for each acorn stowed thus in the stalks!

An observer of birds remarks: "There are several strange features to be noticed in these facts: the provident instinct which prompts this bird to lay by stores of provisions for the winter, the great distance traversed to collect a kind of food so unusual for its race, and its seeking in a place so remote from its natural abode a storehouse so remarkable."

Can instinct alone teach, or have experience and reason taught these birds that, far better than the bark of trees or crevices in rocks or any other hiding place are these hidden cavities they make for themselves with the hollow stems of distant plants?

This we cannot answer. But we do know that one of the most remarkable birds in our country is this California Woodpecker, and that he is well entitled to his Mexican name of *el carpintero*—the carpenter bird.—*Exchange.*

THE OCELOT.

THE smaller spotted and striped species of the genus *Felis*, of both the old and the new world, are commonly called Tiger-Cats. Of these one of the best known and most beautifully marked, peculiar to the American continent, according to authority, has received the name of Ocelot, *Felis pardalis*, though zoologists are still undecided whether under this name several distinct species have not been included, or whether all the Ocelots are to be referred to as a single species showing individual or racial variation. Their fur has always a tawny yellow or reddish-grey ground color, and is marked with black spots, aggregated in streaks and blotches, or in elongated rings inclosing an area which is rather darker than the general ground color. They range through the wooded parts of Tropical America, from Arkansas to Paraguay, and in their habits resemble the other smaller members of the cat tribe, being ready climbers and exceedingly blood-thirsty.

The fierceness of the disposition of this animal, usually called by the common name of Wild Cat, and its strength and agility, are well known, for although it is said that it does not seek to attack man, yet "when disturbed in its lair or hemmed in, it will spring with tiger-like ferocity on its opponent, every hair on its body bristling with rage," and is altogether an ugly customer to meet with.

It was long believed that the Ocelot was the offspring of the domestic cat, but it is now known to be distinct from the wild form of our woods. One would scarcely wish to stroke the

Wild Cat's hair in any direction. As soon as the young are able to see and crawl, their savage nature is apparent, and they cannot be tamed. They are not often hunted, but when accidentally met with by the hunter are despatched as quickly as possible.

In length the Ocelot rather exceeds four feet, of which the tail occupies a considerable portion. The height averages about eighteen inches. On account of the beauty of the fur the skin is valued for home use and exportation, and is extensively employed in the manufacture of various fancy articles of dress or luxury. It may be said to be a true leopard in miniature.

In its native wilds the Ocelot seeks its food chiefly among the smaller mammalia and birds, although it is strong enough to attack and destroy a moderate sized monkey. It chases the monkeys into the tree branches, and is nearly as expert a climber as they are, but, as it cannot follow the birds into the airy region, it is forced to match its cunning against their wings, and it rarely secures them. As is often done by the domestic cat it can spring amongst a flock of birds as they rise from the ground, and, leaping into the air, strike down one or more of them with its swift paw. But its usual method of securing birds is by concealing itself among the branches of a tree and suddenly knocking them over as they unsuspectingly settle within reach of the hidden foe.

The movements of the Tiger-cat are graceful and elegant, and few specimens of animal life found in our zoological gardens are more interesting.



AZAMET THE HERMIT AND HIS DUMB FRIENDS.

AZAMET the vizier had been raised by Sultan Mahmoud to the highest office in the empire. As soon as he was established in his position, he tried to reform many abuses; but the nobles and imaums plotted against him.

Deprived of his property, and deserted by his friends, Azamet withdrew to the wilderness of Khorasan, where he lived alone in a hut of his own building, and planted a little garden by the side of a brook.

He had lived a hermit's life for two years, when Usbeck, one of his old friends, found his dwelling place.

The sage met the vizier about a mile from his hut; the two friends recognized each other and embraced, while Usbeck shed tears; Azamet, on the contrary, smiled, and his eyes beamed with joy. "Thanks be to God, who gives strength to the unfortunate," said Usbeck. "The man who had a gorgeous palace in the rich plains of Ghilem is contented with a hut in the wildest part of Khorasan!"

Presently, when they drew near Azamet's hut they heard a young horse neigh, and saw him come galloping to meet them. When he came near Azamet, he caressed him, and ran home before him.

Usbeck saw two fine heifers come from a pasture near by, and run back and forth near Azamet, as if offering him their milk; they began to follow him. Soon after, two goats, with their kids, ran down from a steep rock, showing, by their gambols, their

delight at seeing their master, and began to frolic around him.

Then four or five sheep came out of a little orchard, bleating and bounding, to lick Azamet's hand as he patted them, smiling. At the same moment, a few pigeons and a multitude of other birds which were chirping on the trees in the orchard flew upon his head and shoulders. He went into the little yard near his cabin, and a cock saw him and crowed for joy; at this noise several hens ran, cackling, to greet their master.

But the signs of joy and love which all these animals showed were as nothing compared to those of two white dogs that were waiting for Azamet at the door. They did not run to meet him, but seemed to show him that they had been faithful sentinels over the house which their master had placed in their care. As soon, however, as he entered, they caressed him lovingly, fawning upon him, throwing themselves at his feet, and only leaping up to lick his hands. When he gave them caresses they seemed beside themselves with delight, and stretched themselves at their master's feet.

Usbeck smiled at this sight. "Weli!" said the vizier, "you see that I am now as I have been from childhood, the friend of all created things. *I tried to make men happy, but they could not let me. I made these animals happy, and I take pleasure in their affection and gratitude.* You see that even though I am in the wilderness of Khorasan, I have companions, and love and am beloved."

Listen! what a sudden rustle
Fills the air.
All the birds are in a bustle
Everywhere.

Such a ceaseless croon and twitter
Over-head!
Such a flash of wings that glitter
Wide outspread!

THE -USE OF FLOWERS.

God might have bade the earth bring forth
Enough for great and small ;
The oak tree and the cedar tree,
Without a flower at all.

We might have had enough, enough
For every want of ours,
For luxury, medicine, and toil,
And yet have had no flowers.

The ore within the mountain mine
Requireth none to grow ;
Nor doth it need the lotus flower
To make the river flow.

The clouds might give abundant rain ;
The nightly dews might fall ;
And the herb that keepeth life in man
Might yet have drunk them all.

Then wherefore, wherefore were they made,
All dyed with rainbow-light,
All fashioned with supremest grace
Upspringing day and night ;

Springing in valleys green and low,
And on the mountains high,
And in the silent wilderness,
Where no man passes by ?

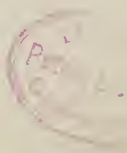
Our outward life requires them not—
Then wherefore had they birth ?
To minister delight to man,
To beautify the earth.

To comfort man—to whisper hope,
Whene'er his faith is dim,
For who so careth for the flowers
Will much more care for him !

—MARY HOWITT.



APPLE BLOSSOMS.
From Nature by Chicago Colortype Co.



ALL NATURE.

W. E. WATT.

BIAS, one of the seven sages of Greece, was a noted political and legal orator. His most famous utterance was, "I carry all my wealth with me." His store of learning and power of speech were always at hand, and his life had been such that all his investments were in the man, rather than in property which might or might not afterwards belong to the man.

He who knows nature and has a habit of seeing things carries with him a fruitful source of happiness. It requires technical knowledge to use any of the mechanical appliances with which civilized life is crowded. It requires artistic training to appreciate any of the great productions of the leaders in the fields of ideal pleasure. But there is no preparation demanded by nature herself of those who would enjoy her feasts. Whosoever will may be her guest.

But because she is so free with the race in giving pleasure to all her guests, it must not be inferred that cultivation and systematic pursuit will not be rewarded. All eyes are blind until they have been opened, and all ears deaf till they have learned desire. Just why I am delighted with the landscape before me is beyond my power to tell, and the reasons for the varying feelings that course through me are too numerous for recognition. But with all these thronging sensations and reflections that occupy me, there is a multitude of others that escape me because I have not had my soul opened in their directions.

Every new item of nature's news that breaks upon the consciousness increases capacity for pleasure for all time. He who meets nature with enlightened senses is rewarded every

day of his life for the pains taken in delightful study by way of preparation. A landscape is infinitely enhanced to him who has pursued the science of color with some diligence. The sounds of the forest speak tenderly to all; but he who knows the secrets of melody and harmony, and the limits of human skill in music, has worlds of delight in the forest that others may not enter. And so has the swain whose childhood was spent among the voices of the trees. The sense of smell has a thousand raptures for the man whose nose has lived up to its possibilities.

To look upon all nature broadly with the familiarity which comes only from long acquaintance and scientific investigation of her various aspects is the highest type of living. While this is not possible to all, yet, much of it may be experienced by every one who has the desire and follows it. The leading facts of all the sciences are open to all who care to know them. The beauties and mysteries of the world are constantly inviting us. And the rapid developments of knowledge in all directions give us all the exciting motives one can desire.

Looking out over the face of the world, we note that there are two sorts of material to be considered. One is alive or was produced by the action of life, and the other is material which has never known a want. We are drawn most to that which has pulsed with sap or blood—that which has made a struggle of some sort.

All things that live are made up chemically principally of four of the elements of the universe which are best adapted by their characteristics for the purposes of life. Three are gases, oxygen, hydrogen, and nitrogen; one is a solid, carbon. All these have what is technically known as affinities

of narrow range and low intensity except oxygen. Oxygen is greedy to attack almost everything, the others unite but sparingly and feebly. From these elements, life chooses combinations that are easily changed in form and light enough to stand up from the earth, to swim in the waters, and even to fly in the atmosphere. So gaseous and quick to change are the things of life that life itself has the reputation of being fleeting. Development is a change in the arrangement of parts, and function is a transformation of motion. These four elements, three gaseous and one solid, three very exclusive and one very free in choosing all sorts of associates, have been the means whereby life has been possible upon the earth. Their characters have provided for what are known as differentiation and integration.

With these materials is formed the mass which is the lowest form of life, protoplasm. This may be formed into cells or not, but it is from this beginning the scale of living things springs, rising in beautiful and mysterious forms till the earth is enveloped and beautified so that we can hardly think of it except as the receptacle prepared by Omniscience for the entertainment of living beings, all of which point to the highest and speak of the expansion and eternal value of the human soul.

By getting next to other substances, or by getting them inside, the organism draws within itself new matter of its own selection. It chooses always material that is chemically similar to itself, and we say it grows. Where it wears away in the pursuit, it makes repairs with the fresh

material. Where the pursuit is wearing, and requires great activity or strength, the new matter is consumed in furnishing energy alone.

When the period of growth is well advanced, the living thing matures organs for the preservation of its kind. Male and female are distinguished. A seed marks the female element in the plant, and in the animal an ovum or egg. And as soon as the race has been provided for, the individual is of no more use upon the face of the earth. It has served its purpose, and merits a reward. But whether in the economy of nature the joys of life are regarded as sufficient reward to every living creature, there follows fast upon the heels of its usefulness a period of lamentable decline. The elements which were so facile in building up the individual are no longer active in furnishing energy, repair, and growth. All these products are lopped off. Weakness, debility, and shrinking ensue. The organism loses its attractiveness for its kind, the pulse of life weakens, and the corpse falls to the earth, yielding rapidly to a process of transformation called decay, which is merely a giving up of what has been recently of use to this form of life to some new form of the same sort or a different one. Life is so swift and relentless that most of its subjects fall by the way and give up their substance so effectually that there is no memory or record left upon the face of the earth that such a form has ever been.

And so God is creating the heavens and the earth. While we participate in a measure in this creation, let us observe and enjoy it and be wise.

THE BLOODLESS SPORTSMEN.

I GO A-GUNNING, but take no gun;
I fish without a pole;
And I bag good game and catch such fish
As suit a sportsman's soul;
For the choicest game that the forest holds.
And the best fish of the brook,
Are never brought down by a rifle shot
And are never caught with a hook.
I bob for fish by the the forest brook,
I hunt for game in the trees;
For bigger birds than wing the air
Or fish that swim the seas.
A rodless Walton of the brooks
A bloodless sportsman, I—
I hunt for the thoughts that throng the woods,
The dreams that haunt the sky.
The woods were made for the hunters of dreams,
The brooks for the fishers of song;
To the hunters who hunt for the gunless game
The streams and the woods belong.
There are thoughts that moan from the soul of the pine,
And thoughts in a flower bell curled;
And the thoughts that are blown with the scent of the fern
Are as new and as old as the world.

—SAM WALTER FOSS.

A BOOK BY THE BROOK.

Give me a nook and a brook,
And let the proud world spin round;
Let it scramble by hook or by crook
For wealth or name with a sound,
You are welcome to amble your ways,
Aspirers to place or to glory;
May big bells jangle your praise,
And golden pens blazon your story;
For me, let me dwell in my nook,
Here by the curve of this brook,
That croons to the tune of my book,
Whose melody wafts me forever
On the waves of an unseen river!

—JAMES FREEMAN CLARKE.

SUMMARY.

Page 6.

WILSON'S SNIPE.—*Gallinago delicata*. Other names: English Snipe, Jack Snipe, Guttter Snipe.

RANGE—From Canada and British Columbia, south in winter to the West Indies, and even to South America. Breeds from the latitude of New England southward.

NEST—Slight depression in the grass or moss of a bog.

EGGS—Three to four; grayish-olive to greenish-brown, spotted and blotched with reddish-brown.

Page 10.

BLACK WOLF.—*Canis occidentalis*. Found in Florida.

Page 14.

AMERICAN RED SQUIRREL.—*Sciurus Hudsonius*. Other name: Chickaree, from its cry.

Common in North America.

Page 18.

PRAIRIE HEN.—*Tympanucus americanus*. Other name: Pinnated Grouse.

RANGE—Prairies of the Mississippi Valley, east to Indiana and Kentucky, north to Manitoba, west to the eastern Dakotas, south to Texas and Louisiana. *T. cupido*, until lately supposed to be this species, is now apparently extinct, except on the island of Martha's Vineyard.

NEST—On the ground in the thick prairie grass.

EGGS—Eight to twelve, of tawn brown, sometimes with an olive brown hue, occasionally sprinkled with brown.

Page 27.

AMERICAN RABBIT.—*Lepus sylvaticus*. Other names: Cottontail and Molly Cottontail.

Page 31.

OCELOT.—*Felis pardalis*. Other name: Tiger-Cat.

RANGE—From the southwestern United States to Patagonia.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IV.

AUGUST, 1898.

No. 2.

NATURE'S ADJUSTMENTS.

BY W. E. WATT.

We have a general notion that whatever Nature does is just right. It has become an article of popular faith that the ways of Nature are not to be improved upon. We feel that he who proposes something better than what is offered by the forces of the material world is by far too presumptuous. We look upon the man who would improve upon what is natural much as the old farmer did upon the lightning rod man. "No, sir; I'd never put a rod up over my house or barn to keep off the lightnin'. 'Twould be defyin' the Almighty. If he wants to strike me, do you suppose I'm goin' to appear before Him and say I put that up to stop him?"

When the qualities of the soil and conditions of the atmosphere have been propitious for the production of husk fiber, we look at the husk upon the corn or the beard of the wheat head and declare solemnly to our friends that the coming winter will be a severe one. We say that Nature knows what is about to occur and has provided for the protection of the grain. We infer that she has thought it all out beforehand and we can see but a small portion of her plans. It seems never to have occurred to us that grain left to shift for itself through

the winter is just as well off and little likely to sustain injury when the husk is thin as when it is thick.

We examine the fur of the Squirrel in the fall and say winter will not be severe because there is not a heavy coat on the specimen examined. We think Nature tells the Squirrel in some mysterious way that there is to be a light winter and that it will not be worth while for him to put much of his summer energy into hair growing, or that he may as well count on frisking through the winter in scant garments because he will not suffer greatly so attired.

We are oblivious of the fact that the fur on the Squirrel depends as to its profusion upon the general health of the subject and the condition of the fluids of his system, and that these are much more influenced by the winter he last experienced and the food he has recently had than by the weather that is to be some months hence.

We frequently speak rapturously of the mimicry of Nature. The Giraffe escapes his enemy by appearing to be a part of a clump of tree trunks, the Butterfly felicitously reposes upon a limb with his gaudy colors folded away and an exterior presented which makes him appear a veritable dead leaf with

no tempting juices for the destroying Bird. But the same Providence which gave these marvelous powers of mimicry also gave the other parties the eyes to see and apparent judgment to penetrate the mask and secure the needed meal. And so the ravening Beast sometimes fastens himself upon the Giraffe in spite of the disguise and the Bird finds the Butterfly in his curious garb.

Those who know least about Nature are loudest in their praise of her remarkable adaptations for special ends. Those who know most about her are obliged to confess that while her ways are marvelous indeed and her adaptations strangely effective and various yet she does not provide accurately and certainly for all contingencies.

In fact there is no such thing in Nature as a perfect adaptation. No living thing is perfectly protected from its enemies. No part is accurately adjusted to the part to which it is to be applied. The beak and talons of the Eagle are not perfectly adapted to flesh tearing. The hoof of the Arabian Horse is not perfectly adapted to carrying him over the sands of the the desert, but the very preservation of the horse upon the sands requires that he shall be peculiarly shod to protect his hoof. No animal that Flies attack has a tail capable of whisking them from every part of its body. A Dog's teeth are beautifully adapted to many purposes, but he cannot remove a Tick from his skin. The Cat has particularly keen sight, adjustable to all degrees of light. But when the Ocelot was being photographed for the July number of BIRDS AND ALL

NATURE the old Cat that purrs about the studio was not keen enough to see that it was a mounted animal. He came forward in a most belligerent attitude with glaring eyes and distended tail. When the artist gave the stuffed beast a slight motion the affrighted cat sped down the stairway and out of the building with the celerity hitherto entirely unsuspected in him.

There is no eye in Nature that sees perfectly and no ear that hears all that is going on. One animal is superior to others in certain ways, but none is perfect. All wings are not for flight. Some are better than others for sweeping through the air, but perfection is found in none.

In most animals are found organs which are not of use. They frequently resemble organs that are of the highest utility to some other form of life, but for the animal in question they are apparently waste material. When the Horse uses but one toe of each foot there seems to be little reason for his having the rudimentary forms of more. There are claws on the legs of many Dogs that have never been called into action. They are so far from the ground and so weak and immovable that the Dog himself does not know they are there.

In every man there are muscles beneath the scalp for moving the ear. We have no such need for ear motion as have many of the lower animals, but it is the despair of many a school boy to discover how few of the race are able to contract these muscles ever so slightly.

The Lammergeier, or Bearded Vulture, is instinctively instructed to

carry marrow bones and Tortoises high into the air and drop them upon stones so as to obtain their contents. Yet he is not beyond making serious mistakes, for one of them is said to have taken the bald head of the great poet Aeschylus for a smooth stone, dropped a Tortoise upon it, and secured in lieu of a luscious meal the lamentable demise of one of the greatest of men.

A true view of Nature leads us to regard whatever we find in an organism not as a perfect instrument to a given end, but as a remnant of what may have been produced by desire on the part of ancestors more or less remote. Indeed, it has well been said that our whole body is but a museum of antiquity of no practical interest, but of great historical importance. What we find in ourselves and elsewhere among living things is not to be regarded as creations perfectly adapted to given ends, for there is no perfect adaptation. Plants and animals are continually

striving for it, but conditions change more rapidly than they and the chase is unsuccessful. Perfect adaptation would be stagnation.

A manifest design of Nature is that things may live. But death is the rule and life the exception. Out of a million seeds but one can grow. All may make something of a struggle; a few fortunate individuals thrive. Not the fittest, but usually some among those most fit. The whole range of life from the *Bathybius Haeckelii* to the tailless Ape exhibits a grand struggle for perfect adaptation with a greater or less failure in store for every individual. The human race is carrying on the same enterprise with the same results. The instant we seem to be fitted for our environment there comes a change of affairs that leaves us confronted with a problem just as interesting and urgent as the old one we flattered ourselves we were able to solve.

REASONING POWERS OF BIRDS.

HERE is something very remarkable in the almost reasoning powers manifested occasionally by birds in eluding pursuit or in turning attention from their nests and young, but in few is this more noticeable than in the Duck tribes. In Capt. Black's narrative of his Arctic land expedition the following instance of this is given:

"One of his companions, Mr. King, having shot a female Duck, fired again, and, as he thought, disabled its male companion. Accordingly, leaving the dead bird, which he had the mortification of seeing shortly afterward carried off by one of the white-headed Eagles, he waded into the

water after the drake, which, far from being fluttered or alarmed, remained motionless, as if waiting to be taken up. Still, as he neared it, it glided easily away through innumerable little nooks and windings. Several times he reached out his hand to seize it, and having at last with great patience managed to coop it up in a corner, from which there appeared to be no escape, he was triumphantly bending down to take it, when, to his utter astonishment, it looked around at him, cried 'Quack!' and then flew away so strongly that he was convinced he had never hit it at all. The bird's object clearly was to draw the gunner away from its companion."

THE SQUIRREL'S ROAD.

It zigzags through the pastures brown,
And climbs old Pine Hill to its crown,
With many a broken stake and rail,
And gaps where beds of ivy trail.
In hollows of its mossy top
The pine-cone and the acorn drop;
While, here and there, aloft is seen
A timid, waving plume of green,
Where some shy seed has taken hold
With slender roots in moss and mold.

The squirrel, on his frequent trips
With corn and mast between his lips,
Glides in and out from rail to rail,
With ears erect and flashing tail.
Sometimes he stops, his spoil laid by,
To frisk and chatter merrily,
Or wash his little elfin face,
With many a flirt and queer grimace.
Anon he scolds a passing crow,
Jerking his pert tail to and fro,
Or scurries like a frightened thief
At shadow of a falling leaf.
All day along his fence-top road
He bears his harvest, load by load;
The acorn with its little hat;
The butternut, egg-shaped and fat;
The farmer's corn, from shock and wain;
Check-pouches-full of mealy grain;
Three-cornered beechnuts, thin of shell;
The chestnut, burred and armored well;
And walnuts, with their tight green coats
Close buttoned round their slender throats.

A busy little workman he,
Who loves his task, yet labors free,
Stops when he wills, to frisk and bark,
And never drudges after dark!
I love to hear his chirring cry,
When rosy sunrise stains the sky,
And see him flashing in his toil,
While frost like snow encrusts the soil.

With tail above his back, he sails
Along the angles of the rails,
Content to gain two rods in three,
And have sure highway from his tree.
Dear is the old-time squirrel way,
With mosses green and lichens gray,—
The straggling fence, that girds the hill,
And wanders through the pine woods still.
I loved it in my boyhood time,
I loved it in my manhood's prime,
Would in the corn-field I could lie,
And watch the squirrels zigzag by!

—JAMES BUCKHAM.



THE COMMON TERN.

ACCORDING to Colonel Goss, these birds are abundant on the Atlantic coast, decreasing in numbers west, and are rare and exceptional on the Pacific coast. They are migratory, arriving from the middle of April to the first of May, returning as early as the first of September. Their habitat is chiefly eastern temperate North America and various parts of the eastern hemisphere, breeding irregularly throughout the range. The nests have been found from the south coast of Florida to the Arctic circle, on the lakes in Wisconsin, and in large numbers in several of the Magdalen Isles, Gulf of St. Lawrence. Writers disagree as to the composition of their nests, some maintaining that they are made of seaweeds and grasses, others that they are without material of any kind, the eggs lying upon the bare ground in a slight depression in the sand. The eggs are three or four, of a pale blueish or greenish drab, thickly and rather evenly spotted and blotched with varying shades of light and dark brown, with shell markings of pale lilac, ovate in form.

Mr. George H. Mackay has described the Terns of Muskeget Island, Massachusetts, and in a recent article in the "Auk," he says: "Civilization is continually encroaching upon the places along the coast occupied by the Terns until there remain at the present time few localities adapted for such breeding resorts. I visited and remained on Muskegon Island July 3-5, 1897, and while there made, as has heretofore been my custom, an exhaustive examination of all the breeding grounds of the Terns. I found on visiting Gravelly Island a considerable falling off from the status of June, 1896, in both nests and eggs;

the occupants were also different, being now almost entirely Common Terns, its former possessors having to a large extent abandoned it." Mr. Mackay has been endeavoring to protect the Terns from the destructive encroachments of hunters and so-called "eggers." He says that this season the Terns arrived at Muskeget in large flocks, thousands dropping from the sky when they were first observed. The number of young birds was unusually large, larger than has been before noticed, which result is probably due to the protection which has been extended to them throughout the breeding season, a condition they have not before enjoyed.

This Tern enjoys a large assortment of names: Sea Swallow, Wilson's Tern, Red Shank, Mackerel Gull, and Summer Gull, are a few of them by which it is known in various localities. In several places on the Atlantic coast it breeds in company with other species, such as Forster's, Arctic, and Roseate Terns, the Laughing Gull, and others. Here they breed by thousands, fairly filling the air when disturbed. They place their nests all over the land above high water line, on the beach, on the sides of the bluffs, and even in the garden cultivated by the lighthouse keeper. At Gull Island fresh eggs can be obtained from the 10th of June to the middle of July, as eggng parties keep them cleaned off about as fast as they are laid. Public opinion is rapidly coming to the rescue of these beautiful birds, and we may reasonably hope that they may not be wholly exterminated. In connection with this article, we call the reader's attention to Vol. I, pages 103-104, where the Black Tern is depicted and described.

BIRDS AND ANIMALS IN THE PHILIPPINES.

I DOUBT if any islands have such a countless variety of animals and flying and creeping things as the Philippines. A stubby variety of horses, fat and furry ponies, is used in Manila and towns. Oxen and a species of Buffaloes are used for heavy draft purposes. The mountains teem with deer. Goats, Swine, Rabbits, and Sheep abound in the mountains and forests in all degrees of wildness. The wild hogs on Samar have sometimes killed natives. There are several hundred varieties of birds, and about twenty that are not known elsewhere. Parrots are more common in the backwoods than Robins are here. Among the forests close to the coasts are found peculiar birds of the Swallow tribe. They make a strange food that the Chinese are so fond of—the bird's nest. Hundreds of natives earn their sole livelihood by hunting at certain seasons for these birds' nests and selling them to the Chinese. Of Monkeys there are a dozen varieties. Bats are simply enormous. They are of the vampire variety. No wonder there is a vast deal of superstition and dread among people in the tropics concerning vampires. They are

frightfully uncanny. I have seen vampire bats with bodies as large as common house cats, and with wings that expand five feet from tip to tip. Let any one be seated or strolling along some moonlight night and have one of those black things come suddenly swooping down past him, and he will have some cause for nervous prostration. I knew one of those Bats to go sailing into the big hotel dining room at Manila one evening when dinner was serving. It came as a horrible apparition. Some women fainted and others shrieked as they went under the tables. The men ran out of the room.

"The seacoast is rich in many forms of fish. The natives, like the Hawaiians, know how to catch them, too. All the natives in the Philippines that I ever knew about (except the rich and aristocratic people in Manila) are fishers. They catch a species of mullet there that is delicious. When these fish come up the coast from the China Sea in schools, the natives will abandon any occupation and even leave a sick hammock to go out and angle off the coast."

Ornithologists all over the world are much interested in the great exhibition of birds about to be opened at St. Petersburg. It is to be an international exhibition, in that it is the aim to exhibit the birds native to every country of the world. The czar has placed himself at its head, the Russian government will assist it with money and influence, and the European and

other governments which were invited to take part in the project have replied favorably. The exhibition has now assumed such gigantic proportions that it has been found necessary to postpone it from the summer of this year to the summer of next year to allow as many regions as possible on the earth to be represented.

BIRDS MENTIONED IN THE BIBLE.

Bittern, Cormorant, Cuckoo, Dove, Eagle, Hawk, Heron, Kite, Lapwing, Night-hawk, Osprey, Ostrich, Owl—

little and large — Peacock, Pelican, Quail, Raven, Sparrow, Stork, Swan, Swallow, and Vulture.



THE PRAIRIE WOLF.

THIS species is more commonly known in the western states by the name Coyote, where it makes night so hideous that novices unused to the "unearthly serenade" feel a dismal longing for other latitudes. It is in size about half way between the Red Fox (see p. 67) and Gray Wolf, of which we shall present a portrait in a subsequent number. Its color is similar to that of its larger relative of the plains, but is of a more yellowish cast.

The Prairie Wolf is an inhabitant of the plains and mountains west of the Missouri river, and is said to be found from the British possessions south into Mexico, whence it derived its common name, Coyote. It was formerly very numerous, but the increase of population and the disposition to hunt and destroy it, have greatly reduced its numbers. The Bison, which was formerly its prey, having become almost extinct, its food supply has been largely cut off. These Wolves subsist on any refuse they can pick up, and are always found on the outskirts of settlements or forts, slinking here and there, eking out what subsistence they may by snatching any stray morsels of food that come in their way. In the southern portion of its range, the Coyote is a miserable cur, scarcely larger than the common Fox.

While this Wolf is an arrant coward, it sometimes exhibits a good deal of sagacity. Near the south coast of San Francisco a farmer had been much annoyed by the loss of his Chickens. His Hounds had succeeded in capturing several of the marauding Coyotes, but one fellow constantly eluded the pursuers by making for the coast or beach, where all traces of him

would be lost. On one occasion the farmer divided his pack of Hounds and with two or three of the Dogs took a position near the shore. The Wolf soon approached the ocean with the other detachment of hounds in close pursuit. It was observed that as the waves receded from the shore he would follow them as closely as possible, and made no foot prints in the sand that were not quickly obliterated by the swell. When at last he had gone far enough, as he supposed, to destroy the scent, he turned inland.

Although members of the Dog tribe, Wolves are held in utter abhorrence by domesticated Dogs. The stronger pursue to destroy them, the weaker fly from them in terror. In the earlier part of English history Wolves are frequently mentioned as a common and dreaded pest. They are still found in parts of France, Russia, and the whole of western Asia. They are very wary and dislike approaching anything resembling a trap. While the Coyotes possess almost identically the same characteristics as other Wolves, man has no reason to dread them unless he meets them in hungry packs. Whoever has had the misfortune to have once been serenaded by these midnight prowlers can well understand the grudge every man in camp bears them. As soon as the camp is silent these beasts of prey prowl in small companies about the low shrubbery which surrounds the camp attracted by the appetizing smell of the campers' supper. The half jubilant long-drawn howl of the Coyote is soon followed by all the available vocal talent of his species in the vicinity, to the intense disgust of all creation except themselves.

A HOUSEHOLD PET.

He was named "Bushy" on account of his tail; no Squirrel, I am sure, ever had a finer one. He lived in a cage at first, but the door was always left open, so that Bushy did not feel he was a captive at all. He took great pleasure in running up the lace curtains of the drawing-room windows, upon the cornices of which he spent a great deal of his time, always taking his nuts up there to eat. At length he concluded to give up his cage and live up there altogether. He would build a nest, but where to find the twigs, wool, and feathers for it sorely puzzled Mr. Squirrel.

One day he scampered up to the top of the house, and in the attic found some cast-off finery of the housemaid. It was hard work for the little fellow to carry a night-cap, or an old pocket handkerchief, or an old stocking in his mouth down two sets of stairs, but it was the best material he could find, and Bushy was determined to build a nest. As well as he could, he jumped from one step to another all the way, with his mouth full, at one time a yard or more of ribbon streaming behind him. In this his feet got entangled,

tumbling him over and over, so he stopped and with his forepaws neatly packed it into his mouth before going further. Sometimes, after all his hard work, Bushy would find the dining-room door closed, so he would have to sit outside very patiently till it was opened. The moment he was admitted, up the curtain he would climb with his material, often dropping it two or three times before reaching the top. It was a very wide, old-fashioned cornice, with a great space behind, and here the nest was built. The old caps, ribbons, and odds and ends were woven into a very large, long-shaped nest, lined with bits of the dining-room door-mat on which he had been so often compelled to wait. At last all was finished, and Bushy moved up into his new house, never again sleeping in his cage. During the day he would descend for his food, which he carried up to his house to eat, then down again to frisk and play about. I am sure Bushy's master was very glad he left the cage door open, for how could the little fellow have shown such intelligence, or been happy, cooped up behind wires all day long?



THE FOX SQUIRREL.

FALLOCK states that the migrations of Squirrels have never been satisfactorily explained. What instinct, he asks, brings together

such immense droves of these animals from all parts of the country and causes them to move with solid phalanx to distant localities, overcoming all opposing obstacles? A few years since there was witnessed a wonderful sight by inhabitants of Pike County, Pa. An immense army of Squirrels arrived at the banks of the Delaware river late one night, and commenced its passage by swimming the next morning. The whole population turned out, and boys and men equipped with large grain sacks and clubs killed them by thousands. They kept coming in a continuous stream throughout the morning, and passed on to the woods beyond. Nothing could deflect them from their course, and they were evidently bound for a fixed point. A similar instance occurred some twenty-five years ago, where a vast assemblage crossed the Mississippi. While these migrations are obviously caused by a scarcity of food, it probably is not the only motive which induces them to undertake long journeys. The southern Fox Squirrel inhabits the Southern States from North Carolina to Texas. It is the largest and finest of our North American Squirrels. Its color is oftenest gray above and white below, but it is also found of all shades of fulvous, and sometimes a deep shining black; its ears and nose are always white. The Western Fox Squirrel occurs in the Mississippi valley; its

color is a rusty grey, and its ears and nose are never white.

Squirrels feed in the early morning, and disappear from eight to nine o'clock, remaining in their holes during the mid-day hours. They appear again in the late afternoon to feed. During the early morning and late evening the hunter secures his prey. The little fellows are very shy, but one may seat himself in full view and if he remains without motion little notice will be taken of him by the Squirrels. The season for hunting them is in fall and winter, although a great many are taken in August when young and tender.

An important factor in the pursuit of this animal is the small Cur-dog trained for the purpose. He will run ahead through bush and wood, tree a Squirrel, and after barking sharply, wait for the master to put in an appearance. A Squirrel thus treed will run up the trunk a short distance, and curling himself down on a limb, will watch his canine pursuer, unmindful of the approach of the two-legged animal bearing a gun. When quite young and inexperienced, a good bag can sometimes be made without a Dog. They are very skillful in secreting themselves from view, when treed by the hunter, but the presence of the Dog seems to utterly upset all calculations of concealment, for knowing the inability of the Cur to do them harm they will sit on a limb and not attempt to hide. The cruel method of smoking out, as practiced by the farmers' sons in winter, when the Squirrels are snugly curled up in their nests will not be described in this article.

THE FOX-SQUIRREL.

Squirrels vary in size and color according to the country in which they live. In Asia there is a Squirrel no larger than a Mouse, and in Africa there is one larger than a Cat.

I am a North American Squirrel, one of the "common" family, as they say. I eat all sorts of vegetables and fruits, as well as Mice, small Birds and eggs. I choose my mate in February or April, go to housekeeping like the birds, and raise a family of from three to nine little baby Squirrels.

Some of my little readers have seen me, perhaps, or one of my family, frisking among the branches, or running up and down the trunks of trees. My enemy the Hawk gets after me sometimes, and then I run up the tree "like a Squirrel," and hide behind one of the large branches, going from one to another till I tire him out.

Squirrels have to be "cunning as a Fox," as they say. When pursued—and oh, how often we are, by men and boys, as well as Hawks—we leap from branch to branch, or from tree to tree, altering our direction while in the air, our tails acting as rudders. At last we are driven into a solitary tree, so that we cannot leap into the branches of

another. Then a boy or man climbs up, tries to shake us from the limb, and at length succeeds in knocking us to the ground. Off we run again, give them a long chase, perhaps, but at last are caught, and probably carried home to be kept in a cage like a little prisoner, or maybe in a stuffy wooden box. How can we be happy or playful under such circumstances? I think it is a great shame to put any animal, bird or otherwise, in a *little* cage; don't you?

There are men who make a business of selling Squirrels for household pets. If you want a young Squirrel—and nobody wants to buy an *old* one—look at its teeth; if young, they will be almost white; if old, a light yellow.

"Oh, mama," cried Dorothy one day, "do look at this dear little tame Squirrel the good man wants to sell. See how tame it is. It will let me stroke it, and never tries to bite."

Mama, who desired her children to have four-footed, as well as two-footed friends, bought the tame squirrel for her little girl. Alas! the *good* man had dosed the poor little animal with laudanum to keep it quiet. It died the next day.



THE LOON.

IN ALL the lakes of the fur countries, says Nuttall, these birds abound, where, as well as in the interior of the most northern of the states, and probably in the inland seas of the St. Lawrence, along the whole Canadian line, they pass the period of reproduction. This species is the most common of its tribe in the United States and is a general inhabitant of cold and temperate climates throughout the whole northern hemisphere. They have been known to breed as far south as the Farne Isles, along with the Eider Ducks, with which they also associate on the shores of Labrador. In the United States from the severity of the winters, the young and even occasionally the old, are seen to migrate nearly, if not quite, to the estuary of the Mississippi.

Cautious, vigilant, and fond of the security attending upon solitude, the Loon generally selects, with his mate, some lonely islet, on the borders of a retired lake far from the haunts of men, where, on the ground, near the water, they build a rude and grassy nest. The Loons are, from the nature of their food, which consists almost wholly of fish, utterly rank and unedible, though in New England the following receipt is given for cooking one of the birds: Having dressed your Loon, stuff it with an iron wedge, then bake or boil. When you can stick a fork into the wedge the bird is ready for the table.

It is chiefly remarkable for the quickness with which it can dive, many observers maintaining that it can dodge a bullet or shot by diving at the flash of the gun. Mr. W. H. Porteous states that he once watched a man for more than an hour fire repeatedly at a Loon on a pond in Maine, the bird being frozen in by thin ice, a small circular space being

kept open by its movements. The ice was not strong enough to sustain the man and the open space not large enough to enable the bird to swim and rise, as a Loon cannot rise in flight from a stationary position in the water. The Loon dodged every shot, by diving, although within easy gunshot range from the shore. It was not killed until the next morning, when the ice had become strong enough to permit the man to go close up to the open space and shoot when the Loon came to the surface. "Under the circumstances," adds Mr. Porteous, "I think the man ought to have been shot instead of the Loon."

"In the fall," says Thoreau, "the Loon came, as usual, to moult and bathe in the pond, making the woods ring with his wild laughter before I had risen. At rumor of his arrival all the mill-dam sportsmen are on the alert, in gigs and on foot, two by two and three by three, with patent rifles and conical balls and spy glasses. They come rustling through the woods like autumn leaves, at least ten men to one loon. Some station themselves on this side of the pond, some on that for the poor bird cannot be omnipresent; if he dive here he must come up there. But now the kind October wind raises, rustling the surface of the water, so that no loon can be heard or seen. The waves generously rise and dash angrily, taking sides with all waterfowl, and our sportsman must beat a retreat to town and shop and unfinished jobs. But they were too often successful.

As I was paddling along the north shore one very calm October afternoon, for such days especially they settle on the lakes, like the milkweed down, a Loon, suddenly sailing out from the shore toward the middle a few rods in front of me, set up his wild laugh and betrayed himself. I pursued with a

paddle and he dived, but when he came up I was nearer than before. He dived again, but I miscalculated the direction he would take, and we were fifty rods apart when he came to surface this time, for I had helped to widen the interval; and again he laughed long and loud, and with more reason than before. He maneuvered so cunningly that I could not get within half a dozen rods of him. Each time, when he came to the surface, turning his head this way and that, he coolly surveyed the water and the land, and apparently chose his course so that he might come up where there was the widest expanse of water and at the greatest distance from the boat. It was surprising how quickly he made up his mind and put his resolve into execution. He led me at once to the widest part of the pond, and could not be driven from it. While he was thinking one thing, I was endeavoring to divine his thought. It was a pretty game, played on the smooth surface of the pond, man against a Loon. Some times he would come up unexpectedly on the other side of me, having apparently passed directly under the boat. So long-winded was he and so unwearable, that when he had swum farthest he would immediately plunge again, nevertheless; and then no wit could divine where in the deep pond he might be speeding his way like a fish, for he had time and ability to visit the bottom of the pond in its

deepest part. It is said Loons have been caught in the New York lakes eighty feet beneath the surface, with hooks set for trout. I found that it was as well for me to rest on my oars and wait his reappearing; for again and again, when I was straining my eyes over the surface one way, I would be startled by his unearthly laugh behind me. He was indeed a silly Loon, I thought, for why, after displaying so much cunning did he betray himself the moment he came up by that loud laugh? Did not his white breast enough betray him? It was surprising to see how serenely he sailed off with unruffled breast when he came to the surface, doing all the work with his webbed feet beneath. His usual note was this demoniac laughter, yet somewhat like that of a water-fowl; but occasionally when he had balked me most successfully and he came up a long way off, he uttered a long-drawn, unearthly howl, probably more like that of a Wolf than any bird. This was his looning, perhaps the wildest sound that is ever heard here, making the woods ring far and wide. At length, having come up fifty rods off, he uttered one of those prolonged howls, as if calling on the Gods of Loons to aid him, and immediately there came a wind from the east, rippled the surface, and filled the whole air with misty rain. And so I left him disappearing far away on the tumultuous surface."

THE MOCKINGBIRD.

WISHING to verify a statement which we had seen in a contemporary, we wrote to Mr. R. F. Bettis, of Tampa, Florida, requesting, if it were true, that he would confirm it, although, from our acquaintance with the bird, we had no doubt of its substantial correctness. In response Mr. Bettis writes us as follows:

"Yours of June 24 received. Will say in regard to the Mockingbird, I live one and one fourth miles north of the courthouse in Tampa. I have a lot containing two acres of land, and it is grown up in live and water oak bushes which are very dense in foliage. It is a fine place for birds to nest and raise young. I do not allow any one to shoot or destroy the birds on my place, and it doesn't take the birds long to find out a place where they are protected. I think there are about twenty-five or thirty Mocking birds on my place, and they become very tame.

About two years ago one of the birds took to coming into the house, and sitting on the chairs and warbling in a low tone, and my wife and children began to talk to it and put bread crumbs on the window sill for it, and it soon began to come for something to eat. It would sit on the trellis in front of the window and sing for hours at a time, and on moonlight nights would sit on the chimney and sing for half the night. * * *

It would recognize the family, and when my wife and daughter would go from home, it would fly along and alight on the fence and give a chirping noise as though it did not want them to go, and on their return would meet them the same way, but the chirping would be in a different tone, as though glad to see them. When they were in the house it would sing some of the sweetest notes that ever came from a bird's throat. Every morning at about 5 o'clock it would peck on the window pane until we got up and opened up the house. About six months ago while all the family were away some Cuban and negro boys came by my place and shot it, and it seems as if something were missing from the place ever since. But I have three more that will come in on the back porch and eat crumbs. Two are on the back porch now about fifteen feet from me while I write, but they are not as gentle as the other one. There has been so much shooting about my place since the soldiers came that it frightens the birds some. The soldiers have a sham battle every day, around my house and sometimes in my yard.

Hoping you can cull out of this what you want for your magazine, I am

Yours truly,

R. F. BETTIS.

THE BOBOLINK'S SONG.

Suddenly from the dead weed stalks in the draw, where the Blackbirds had sung yesterday, there broke forth the most rollicking, tinkling, broken-up, crushed-glass kind of bird melody that he had ever heard—something in perfect accord with his mood again; and looking up he saw a flock of black and white birds all mingled in, some plain,

streaked, sparrow-like kinds—the former given to the utmost abandon of music. He had seen these birds before occasionally, but he never knew their names, and now he found there was more he had not known, for he had heard the Bobolink sing for the first time.—*From Baskett's "At You All's House."*

HOW BUTTERFLIES ARE PROTECTED.

IN the July number of BIRDS AND ALL NATURE we quoted from an interesting article in the *Boston Transcript* some information concerning the commercial aspect of Butterflies. From this study of the remarkable collection of the Denton Brothers of Wellesley, we print another extract, which will indicate to our readers something of what they may expect to see in future numbers of BIRDS, as it is our purpose to present all of the remarkable specimens of these insects. Some of our subscribers tell us that they would rather have the pictures than the specimens themselves. In an early number we shall present a picture of the wonderful Butterfly *Croesus*. It is an inhabitant of India, and even there is rarely seen and difficult to secure. It is of deep dead black, with broad splotches on the wings, which are exactly the color of new, untarnished gold, its name being given it for this characteristic. But, as the *Transcript* says, "perhaps the most interesting thing in looking over the Dentons' collection is to have them explain the wonderful ways in which they are protected from their natural enemies, the birds. Perhaps the most remarkable instance of the way in which this is done is the leaf butterfly, a native of India. The upper side of this insect's wings has the characteristically brilliant coloring of its country, but the under side is of a dull brown, the significance of which is not seen until the insect alights and closes its wings. When it is in this position it has exactly the appearance, in shape and color, of a dead leaf, and this is so exact that even the little dark spots caused by decaying fungi on the leaves are reproduced.

"What is most wonderful of all is that these spots vary, and in different

specimens have the appearance of different kinds of fungi, the imitation being invariably a perfect one.

"This characteristic is to be seen in nearly all kinds of butterflies, the under side of the wings of the most brilliantly colored species being of a dull color which does not readily attract attention. Almost the only variation to this is in certain species which ordinarily carry their wings erect, and droop them when they alight. In these the brilliant coloring is on the under side of the wing, and the dull color on the upper side. Perhaps the most remarkable single case known is that of a certain Indian moth, which is a heavy flyer, and found in the woods. When this moth alights, it leaves only the tip of its wings sticking out of the leaves, and this tip, in marking, color, and attitude, has exactly the appearance of the head of a cobra. The same general scheme may be observed in our native moths, and also in most other heavy flyers, in the sharply defined round markings, one on each wing. These have the appearance of an eye of some good-sized animal, and keep many birds from making any closer investigation.

"Another interesting instance of of the self-protecting instinct is found here in the habits of some kinds of our native butterflies. Some of these are naturally protected by having so strong and unpleasant taste that the birds will not eat them. The habits of these kinds are imitated by other kinds that have a strong resemblance to them, but which are not naturally protected, and this is so successfully done that the birds let them alone and prey upon other varieties that have just as strong a resemblance to, but do not imitate the actions of the protected ones."

MID-SUMMER.

The hills are sweet with the brier-rose.—WHITTIER.

Sweet is the rose, but grows upon a brier.—EDMUND SPENCER.

As though a rose should shut, and be a bud again.—KEATS.

What mortal knows Whence comes the tint and odor of the rose.

THOMAS BAILEY ALDRICH.

The rose saith in the dewy morn,
I am most fair;
Yet all my loveliness is born
Upon a thorn.—CHRISTINA G. ROSSETTI.

The roses grew so thickly, I never saw the thorn,
Nor deemed the stem was prickly until my hand was torn.

—PETER SPENCER.

Gather ye rosebuds while you may,
Old Time is still a-flying;
And this same flower that smiles to-day
To-morrow will be dying.—HERRICK.

If this fair rose offend thy sight,
Placed in thy bosom bare,
'Twill blush to find itself less white,
And turn Lancastrian there.—UNKNOWN.

I know a bank where the wild thyme blows,
Where ox-lips and the nodding violet grows,
Quite over-canopied with luscious woodbine,
With sweet musk-roses and with eglantine.—SHAKESPEARE.

The rose is fairest when 'tis budding new,
And hope is brightest when it dawns from fears;
The rose is sweetest washed with morning dew,
And love is loveliest when embalmed in tears.—SCOTT.

My life is like the summer rose
That opens to the morning sky,
But ere the shades of evening close,
Is scattered on the ground—to die!
Yet on the rose's humble bed
The sweetest dews of night are shed.

RICHARD HENRY WILDE.

THE RED FOX.

EXCEPT in South America and Australia, Foxes are distributed over all the great continents. There are known to be between twenty-five and thirty species. They differ from the dog family in the greater sharpness of the nose and the greater length and bushiness of the tail.

The Red Fox of eastern North America is closely allied to the common Fox of Europe, and is regarded by many naturalists as only a variety of the common species, an opinion which is somewhat confirmed by the fact that no remains of the Red Fox have been found in the cave deposits, although remains of the Grey Fox have been. It is larger than the common Fox of Europe, the fur longer and softer, and the color more brilliant. It is said that it does not possess the wind of the English Fox. It runs for about a hundred yards with great swiftiness, but its strength is exhausted in the first burst, and it is soon overtaken by a wolf or a mounted horseman. In Canada and the United States it is largely hunted for its valuable fur, many thousands of skins being annually exported. The Fox is exceedingly shy and difficult of approach, owing probably to the persistency with which it is hunted by the fur traders. Only the Red and Grey Foxes are hunted. There are several permanent colors of this species similar to those found in our Squirrels, the young presenting a variety of colors in the same litter. In Ohio and others of the middle states, Foxes are said to be hunted as follows: On an appointed day, the whole of the population of the neighborhood turn out and inclose as large a tract of country as possible, all hands

leisurely advancing toward some point near the center of the circle; as they advance a great noise is made that the game may be driven before them. When the circle is quite small, and the Foxes are seen running about looking for an opening by which to escape, small boys are sent in with directions to catch the animals, a task which is not accomplished without much exertion and perhaps a few bites. When a Fox is caught, it is sold to pay the expenses of the hunt.

Fox hunting as practised in England was transported to this country as early as the middle of the eighteenth century. In the mother country it is one of the greatest pleasures accorded to the titled gentry; the Horses are bred for the purpose, and a first-class hunter commands a large price. Many Virginia planters of leisure and means were accustomed before the Civil War to keep a number of Hounds, and with the best riders of the neighboring county, frequently held their "meets," when, with horn and whipper-in, and all other accompaniments, according to true English Fox-hunting rules, they would start Reynard and follow him to the death. The wealthy and leisure class of New York pursue the sport in true English style in many places on Long Island.

When pursued, the Fox gives out a strong, disagreeable scent, which lies so long on the ground that it may be perceived for nearly an hour after he has passed. Of its cunning when pursued, many tales are related, such as driving another Fox out of its lair and forcing it to substitute itself as the chase; diving into a heap of manure, to throw the dogs off the scent; fording streams, doubling or its track, and so forth.

THE RED FOX.

Like the Squirrels, Foxes vary in size and color according to the countries in which they live. Their habits are mostly nocturnal, that is to say, they prowls around after dark.

By day the Fox lies concealed in his burrow—if he owns a house of that sort—or else in the depths of some thicket. Toward evening he goes out in search of something to eat—Hare, Rabbit, Pheasant, Mouse, or Bird.

Reynard, as the Fox is often called, does not attempt to chase the Hare, for it would be too swift for him, nor the Rabbit, for it would quickly dive into its hole, nor the Pheasant, for it would fly away. No, indeed! Mr. Fox is too cunning for that. He just quietly creeps to some place where Hares or Rabbits or Pheasants are likely to pass, and then as they run by him, out he pounces and secures his evening meal.

When the Rabbit has a nest full of little "Bunnies," she takes good care to keep them at the end of the burrow. It is too small for the Fox to creep into, so she thinks they are safe. But Mr. Fox finds a way, a much better way, he thinks, to get at the little, soft, furry things, which will hardly make him a

meal anyway. He sniffs around, locates the spot right above the burrow, digs downward, and soon—well, when he gets through there are no "Bunnies" in the nest. Mr. Fox smiles, winks one eye, and trots off.

Sometimes he steals into a hen-roost, and woe to nearly every chicken in the roost. He eats all he can, carries some of them home, and the remainder he buries for future use.

"Cunning as a Fox." That is an old saying, you know, and we apply it to persons who take advantage of their fellow beings.

However, no matter how great a rascal the Fox is, we must pity him when pursued for "sport" by a pack of hounds, as well as men and women. When irritated or alarmed, the Fox gives off a strong, disagreeable scent, which lies so long on the ground that it may be perceived for nearly an hour after he has passed. He has been known to dive into a heap of manure to throw the dogs off the scent; jumping over a wall, run a little way, come back again, lie under the wall until all the dogs had passed, then leap a second time over the same place where he had passed before, and make off on his old track.

THE LEAST SANDPIPER.

THIS lively, social little Sandpiper is common throughout America, nesting in the Arctic regions. It is migratory, arriving the last of March to the first of May, a few occasionally remaining till November. It has been found breeding as far south as Sable Island, Nova Scotia, but its usual breeding grounds are north from Labrador and Alaska to Greenland, wintering from California and the Gulf states southward. It is more restless and active than the larger Sandpipers, but in habits it differs little, if any, from them. It runs nimbly about, often with the large waders, feeding around and beneath them, apparently heedless of danger. While watching the birds, they will often pass close to the feet, but at the least motion the whole flock will spring into the air "like a flash, with a startled *Peeep, peeep*, and in a compact form swiftly sweep about in an uncertain manner, canting from side to side, showing rapidly the white beneath and the dark above, a wavy, pretty sight, the white at times fairly glistening in the sunlight." When migrating or going any distance their flight is steady and direct. Audubon, who observed the breeding habits of the birds in Labrador, says that at all periods, excepting those at which they have nests containing eggs, or young so small and feeble as to require all the care of their parents, the flight of this species resembles that of the Common Snipe (see *BIRDS*, Vol. IV., page 7); but when started from the nest, or from any place in the immediate vicinity, it rises and moves off low over the ground, with deeply incurved wings, and with a whirling motion thereof, which, if as rapid as those of a Partridge, would appear quite similar, but on such

occasions the Lesser Sandpiper moves slowly, and instead of uttering the note of independence, as it were, which it emits at other times, while freely and fearlessly traveling, it gives out sounds weakened by grief or anxiety, for the purpose of inducing the observers to follow it. If on the ground, it acts in a similar manner, moves off slowly, and limping as if crippled, and this at times quite as much as if one had come upon it while on its nest, or surprised it with its young.

The Sandpiper's nest is placed on the ground in a slight depression, scantily lined with leaves and grasses. The eggs are three or four, of ground color cream buff to light drab, spotted and blotched irregularly with varying shades of brown, thickest about the larger end.

The Least Sandpiper is always found associated with the Semi-palmated Sandpiper, which in the later summer throng our shores and form staple sport to the youthful and city tyros. Flocks of birds are often composed of both species. When this is the case, the latter, even if largely in the minority, take the lead, as they are of somewhat larger size, stronger in flight, and have a louder note. When not in company with other species, none of our shore birds are more confiding and unsuspecting than these, says Davie, large flocks continuing their search for food almost under the feet of the observer.

The black and white outlines which are often seen of this bird make it possible, perhaps, to recognize it, but the perfect likeness which we present will enable the observer to distinguish it at a glance from all others of the family, of which there are about a dozen well-known species.



From col. Chi. Acad. Sciences.

LEAST SANDPIPER.
Life-size.

Copyright by
Nature Study Pub. Co., 1898. Chicago.

INSTINCT AND REASON.

IN a recent issue of the *New York Evening Post*, Caroline H. Dall writes interestingly on this subject as follows :

"I wish to draw the attention of such of your readers as are interested in the discussion of the nature of instinct, to a curious example of it, as distinct from reason, which I have lately witnessed.

"Entering the parlor of a friend the other day, my attention was instantly attracted to a Florida Mockingbird. He was flying about in an eager manner, with something like a long black straw in his bill. My friend entering, I asked: 'What is your bird doing?' 'Building a nest,' she answered. 'Has he a mate?' 'No, he has never had one,' she replied, 'nor has he ever seen a nest. That black straw is a shaving of whalebone which lasts him better than anything else.' At this moment the bird flew into a corner of the cage, and, stooping, dropped the whalebone, waited a moment as if for some response, and then flew away to repeat the manœuvre.

" 'Does he not want something soft?' I asked. 'I sometimes give him yarn or wool; he tears it all up, works it all over, and then carries it to that corner. He evidently thinks it his duty to provide material, but he does not undertake to use it.' 'And what will he do next?' I asked. 'He will, after a day or two, brood over that corner, sitting close and spreading his wings out as broadly as possible. He does this two or three times a day.' 'And after that?' 'Later the paternal instinct seems to be aroused in a different way. He goes to his food cup, takes some food in his mouth, and drops it into his corner. He repeats this several times, as if he were feeding his young. I do not know how many young birds he ought to expect, but I should like to know, to see if he counts right!'

"I have sometimes known a male canary to build a nest in the spring, carrying the process nearer to completion, but I have never heard of an instance like this, and think it may interest others than myself."

* * * *

IN spite of all the efforts that have been made in the interests of common sense and common humanity, there appears to be no doubt that the savage and indiscriminate slaughter of all birds of bright plumage is still going on for the gratification of feminine vanity. Indeed, the position of the unfortunate birds possessing the fatal gift of beauty seems to be worse than ever. There was sold the other day in London a consignment of nearly half a million birds, or parts of birds, as follows: Osprey plumes, 11,352 ounces; Vulture plumes, 186 pounds; Peacock feathers, 215,051 bundles; Birds of Paradise, 2,362 bundles; Indian Parrots, 228,289 bundles; Bronze Pigeons,

including the Goura, 1,677 bundles; Tanagers and sundry birds, 38,198 bundles; Humming birds, 116,490 bundles; Jays and Kingfishers, 48,759 bundles; Impeyan and other jungle fowl, 4,952 bundles; Owls and Hawks, 7,163 bundles. In one of the most widely circulated English papers the fashionable news from Paris begins: "Birds are worn more than ever, and blouses made entirely of feathers are coming into fashion." "Rare tropical feathers," ordered by specialists from abroad, are specified as those most likely to be in demand, but no bird of any kind is safe that has a feather capable of being used for feminine decoration.

THE MOUNTAIN SHEEP.

BIGHHORN is the name by which this interesting animal is chiefly known to western people, it being found in greater or less abundance from the Missouri River to the Pacific Ocean. It also occurs in New Mexico, Arizona, and Southern California, but it has not been discovered in any numbers south of the United States. It is more numerous in the Rocky Mountains, the Sierra Nevada Mountains, and the Coast Range, but it is by no means confined to the mountains, being also numerous along the *Mauvaises Terres* or the "Bad Lands" of the White River, the Little Missouri, Yellowstone, and Upper Missouri, in whose desolate and arid wastes it apparently delights. The Bighorn, in fact, finds in every rough country sufficient for its requirements, and it demands only that there shall be steep and difficult heights to which it may retreat when pursued. Every species of sheep would prefer a hilly habitat, but the Bighorn could scarcely exist on a level plain.

Somebody has said that Mountain Sheep would be aptly described as having the head of a sheep with the body of a deer. In size, however, it exceeds the largest deer, and a full-grown specimen will weigh from 300 to 350 pounds. Sir John Richardson gives the following measurements of an old male: Length to end of tail, 6 feet; height at shoulder, 3 feet 5 inches; length of tail, 2 inches; length of horn along the curve, 2 feet 10 inches; circumference of horn at the base, 1 foot 1 inch; distance from top of one horn to top of its fellow, 2 feet 3 inches. The coat is soft to the touch, the hair resembling that of the Caribou Deer, and, in some degree,

that of the Antelope. It is short, fine, and flexible in its first growth in the autumn, but becomes longer as the season advances, until in winter the hair is so thick and close set that it stands erect. As the winter advances the dark tips of the hair are rubbed off so that by spring the old males are quite white. Under the hair a fine wool covers the skin.

The movements of the Bighorn are quite graceful, and the agility and lightness with which it scales steep bluffs, runs along the narrowest edge on the face of a precipice, or leaps from rock to rock in its descent from some mountain-top, are excelled by no other animal. These Sheep feed early in the morning, and retire during the middle of the day to points high up on the bluffs or mountains where they rest until sundown, when they return to their feeding grounds. Except during the month of December the old rams are found in small bands by themselves, the females and young associating together in companies of from five to twenty. In a country where they have not been disturbed by man they are occasionally seen in much larger herds.

No animal is more shy and wary than the Bighorn, and it therefore requires in its successful pursuit the greatest patience and deliberation, as, if it receives the slightest hint of the enemy's presence, it immediately disappears. Many a hunter of experience has never killed a Mountain Sheep, as these vigilant mountain climbers are usually able to elude their enemies.

The instinct of self-preservation is remarkably developed in the Mountain Sheep, and only animals of equal agility and superior cunning can secure them. In their mountain fastnesses they are comparatively free from the



Copyright by
Nature Study Pub. Co., 1898, Chicago.

MOUNTAIN SHEEP.
1 10 Life-size.

pursuit of man; the things they have most to fear are the avalanche and glaciers. The elements of danger, however, only serve to render its pursuit more attractive to the ardent sportsman, and when in a country where it abounds, deer, antelope, and even elk are likely to be neglected for the Mountain Sheep. The flesh, too, is most delicious, and is regarded as much superior to any wild meat which the west affords. Hallock says that he knows of no more delicate dish than is afforded by a yearling ewe in good order seasoned with that wonderful sauce furnished by the free, open-air life of the plains and mountains. "The glory of fat cow pales, and even elk and black-tailed deer meat hide their diminished heads before the rare toothsome-ness of a juicy saddle or the dripping ribs of a young and tender Bighorn."

"To hunt the Mountain Sheep successfully the candidate for honors should have some experience with large game, should have the patience and endurance possessed only by the most enthusiastic sportsman, and should be a fair shot with the rifle. In the gray of the morning, before attempting to look for his game, he should seek the highest ground in his vicinity whence a wide view of the surrounding country may be obtained, and from this point, with the good glass that is an indispensable part of a hunter's outfit, he should search the little ravines and grassy meadows running down from the hills. The sheep are always on the watch for enemies

upon the lower ground, but rarely turn their glances to the heights, which, if disturbed, they will seek for safety."

It is indeed marvelous that these animals should be able to descend with facility the most abrupt precipices and cross canons, the sides of which are almost vertical, and this has given rise to the idea that they can throw themselves from great heights, and striking on their horns, can rebound uninjured and alight on their feet. Indeed, this is somewhat imaginative as it is apparently unreasonable. It is on account of the vast size of the horns, and the fact that these are often battered and splintered that this statement has been accepted as worthy of belief. It has been suggested, however, that even if the animal's head could stand so great a shock, it's neck would not. If it were true, how could females and young males, whose horns are little larger than those of the goat descend the cliffs, which they do as actively and successfully as the old males? The fact is that the splintered condition of the horns of the bucks is due to their battles and their play at all times of the year. The feet of Mountain Sheep are precisely adapted for their life among the crags, and they seem to be able to cling to any surface which presents the slightest inequality. Only the Wild Goat could pass over the same dangerous places. May or June are given in some of the best works on natural history as the time when the young are brought forth.

A SEMINARY FOR TEACHING BIRDS HOW TO SING.

BUYING and importing song birds, says the *Scientific American*, occupies the time and attention of several scores of people in New York, and as the distributing center of this peculiar trade, the city is often the home of considerable numbers of song birds gathered from all quarters of the globe. On the East side, in Fourth street, there are several remarkable aviaries where, without doubt, a study of one branch of ornithology can be pursued under conditions more favorable than elsewhere on this continent, and a visit to one of these bird conservatories of music is better than a trip to the fields or woods to listen to the songs of the wild warblers. The owner of the aviary is a German—more than probable from some little village in the Hartz Mountains, where bird-raising is the chief industry,—and he not only feeds and tends his little birds with loving care, but teaches them to whistle and sing in tune to the accompaniment of an old reed organ or flute.

There are several large importing houses of song birds in New York, and in the busy season they employ from twenty to forty travelers who go back and forth from Europe to purchase the pick of the Canaries, Bullfinches and other European songsters. The consignments come chiefly from Germany and England. Nearly all the Canaries raised in the world for cage purposes come from these two countries, and most of the German exporting houses have distributing branches in New York. The birds are sent over by steamer in large consignments under the charge of an expert care-tender, who does nothing else but feed and doctor the little pets placed under his charge. One experienced man can take charge of five large crates, each

one containing two hundred and ten cages of birds, or a little over a thousand in all. Sometimes during the rush season the care-tender has five hurricane deckers to watch, or fourteen hundred cages and birds to look after during the long hours of the days and nights.

That this work is not easy, any one who has had the privilege of looking after a single canary for a week can well understand. Feeding and watering over a thousand birds, and cleaning out their cages every day, makes up a routine of work on shipboard that begins at four o'clock in the morning and does not end until late in the afternoon. When seasickness makes life miserable for the passengers, the canaries are apt to be uncomfortable in their crowded quarters. Sometimes a disease known as "schnappen" breaks out among the Canaries at such times, and as this is fearfully contagious, it sweeps through the crowded bird quarters on shipboard and decimates the ranks at a terrible rate. Cases are known where only ten birds have survived out of an importation of eight hundred to a thousand, the disease performing its terrible work in a week's time. This is supposed to be caused as much by the over crowded and poorly ventilated condition of the birds' quarters as by the rolling of the ship. If you ask Fritz if his birds get seasick, he will answer emphatically "No," but he will add softly to himself "schnappen." And in that word is conveyed much of meaning that the lay mind cannot appreciate.

When the imported birds arrive in port, they are hurried immediately to the importing houses, or to the different quiet aviaries in the German quarters, where experienced bird raisers take them in charge. It is at this latter place that one may make an

inspection of the singers which are destined to carry song and delight into so many homes. Most of them are trained birds and they whistle and sing to perfection, and all that their German attendant has to do is to feed and water them properly. If disease breaks out among them, he is supposed to know just what to do, and in most instances he does prove an expert bird doctor.

In the mating and breeding season, however, young birds appear in the great aviary which must be taught to sing and whistle accurately. Most people imagine that all the perfection of song cage-birds is inherited, and they would be surprised to learn the amount of labor bestowed upon them in order to make their tunes accurate. The young birds that have the proper voices for great artists are trained in the most careful manner. In the Hartz Mountains, where Canary training reaches its highest development, the throat and voice of each young Canary are tested, and those selected for the highest training are set apart by themselves. They are sent to a school of instruction that is unique in its methods. At the head of this school is probably a Canary of the St. Andreasberg type, which strikes the right note for all the youngsters to imitate. The young birds are taken into the room in their cages, with cloth draped over them to shut out the light until the proper time has come for singing. Then the light is admitted and the teacher begins her warbling. The young birds, which have probably never yet attempted to pipe, leave off their feeding and listen to the marvelous outburst of pure song. They become uneasy and enraptured, and in a short time they try to imitate the song; but they make miserable failures for many days. Eventually

some of them strike the right note, and at the end of the week the most promising ones are separated from the rest and placed in rooms with the best singers. In this way their voices are gradually cultivated, and new songs are taught them.

There are several such schools for canaries in New York, but they are devoted entirely to the comparatively few Canaries raised for the trade in this country. Most of those imported have already been trained to sing accurately, although after their long sea voyage they need a little extra training to bring their voices to perfection. The best trained Canaries are the St. Andreasberg Canaries, whose notes are considered the finest of any in existence. Originally these notes were obtained by placing a Nightingale in the breeding room of the young Canaries, and the natural, clear-toned voices quickly blended the song in with their natural notes. In time, by careful breeding and selection, the present type of the St. Andreasberg Canary was produced, but the pure, bracing air of the Hartz Mountains is considered necessary for the proper development of one of these superb singers. A true St. Andreasberg singer cannot, it is believed by bird trainers, be reared outside of the Hartz Mountains, and it is claimed that only about ten per cent of those raised in their native place ever pass the critical examination of the judges. They are sold according to the perfection of their song power, the best imported bringing as much as \$25 to \$50 apiece, and ordinary ones as little as \$4 to \$5. As a rule they are very small and insignificant looking birds, and not until they have opened their little throats to sing, does one comprehend their mission in life.

SUMMARY.

Page 46.

COMMON TERN.—*Sterna hirundo*. Other names: "Sea Swallow," "Wilson's Tern," "Red Shank," "Mackerel Gull," and "Summer Gull."

RANGE—The greater part of the northern hemisphere and Africa. In North America chiefly confined to the eastern province, breeding variously throughout its range.

NEST—Above high water line on the beach and on the sides of the bluffs; made of grass and sea weeds.

EGGS—Three, greenish to deep brown in color.

Page 50.

PRAIRIE WOLF.—*Canis latrans*. Other name: "Coyote."

Found in the western part of North America.

Page 54.

FOX SQUIRREL.—*Sciurus cinereus*. Other name: "Cat Squirrel."

A common North American species.

Page 58.

LOON.—*Urinator imber*.

RANGE—Northern part of northern hemisphere. In North America breeds from the

northern tier of states northward; in winter south to the Gulf of Mexico and lower California.

NEST—At or near the edge of the water on marshy or boggy grounds; they are quite bulky and made of water grasses with a mixture of moss and mud.

EGGS—Two, olive brown, more or less spotted and blotched with blackish brown.

Page 67.

AMERICAN RED FOX.—*Vulpes fulvus*. Common in the United States.

Page 71.

LEAST SANDPIPER.—*Tringa minutilla*. Other name: "Peep."

RANGE—The whole of North and South America, breeding north of the United States.

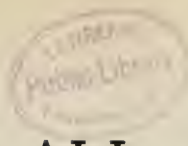
NEST—On the ground.

EGGS—Three or four.

Page 75.

MOUNTAIN SHEEP.—*Ovis Montana*. Other name: "Bighorn."

Inhabitant of the mountains of western America. Its northern range extends as far as Alaska.



BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IV.

SEPTEMBER, 1898.

No. 3.

SOME ANIMAL PROPENSITIES.

IT is not quite agreeable to contemplate many of the shortcomings, from a moral point of view, of certain of the animal creation, and even less to be compelled to recognize the necessity of them. Thievery in nature is widely extended, and food is the excuse for it. Civilization has made the practice of the humanities possible among men, but the lower animals will doubtless remain, as they have ever been, wholly subject to the instincts with which nature originally endowed them.

Huber relates an anecdote of some Hive-bees paying a visit to a nest of Bumble-bees, placed in a box not far from their hive, in order to steal or beg the honey. The Hive-bees, after pillaging, had taken almost entire possession of the nest. Some Bumble-bees, which remained, went out to collect provisions, and bringing home the surplus after they had supplied their own immediate wants, the Hive-bees followed them and did not quit them until they had obtained the fruit of their labors. They licked them, presented to them their probosces, surrounded them, and thus at last persuaded them to part with the contents of their "honey-bags." The Bumble-bees did not seem to harm or sting them, hence it would seem to have been persuasion rather than force that produced this instance of self-denial. But it was systematic robbery, and was persisted in until the Wasps

were attracted by the same cause, when the Bumble-bees entirely forsook the nest.

Birds, notwithstanding their attractiveness in plumage and sweetness in song, are many of them great thieves. They are neither fair nor generous towards each other. When nest-building they will steal the feathers out of the nests of other birds, and frequently drive off other birds from a feeding ground even when there is abundance. This is especially true of the Robin, who will peck and run after and drive away birds much larger than himself. In this respect the Robin and Sparrow resemble each other. Both will drive away a Black-bird and carry away the worm it has made great efforts to extract from the soil.

Readers of Frank Buckland's delightful books will remember his pet Rat, which not infrequently terrified his visitors at breakfast. He had made a house for the pet just by the side of the mantel-piece, and this was approached by a kind of ladder, up which the Rat had to climb when he had ventured down to the floor. Some kinds of fish the Rat particularly liked, and was sure to come out if the savor was strong. One day Mr. Buckland turned his back to give the Rat a chance of seizing the coveted morsel, which he was not long in doing and in running up the ladder with it; but he had fixed it by the middle of the back,

and the door of the entrance was too narrow to admit of its being drawn in thus. But the Rat was equal to the emergency. In a moment he bethought himself, laid the fish on the small platform before the door, and then entering his house he put out his mouth, took the fish by the nose and thus pulled it in and made a meal of it.

One of the most remarkable instances of carrying on a career of theft came under our own observation, says a writer in *Cassell's Magazine*. A friend in northeast Essex had a very fine Aberdeenshire Terrier, a female, and a very affectionate relationship sprang up between this Dog and a Tom-cat. The Cat followed the Dog with the utmost fondness, purring and running against it, and would come and call at the door for the Dog to come out. Attention was first drawn to the pair by this circumstance. One evening we were visiting our friend and heard the Cat about the door calling, and some one said to our friend that the cat was noisy. "He wants little Dell," said he—that being the Dog's name; we looked incredulous. "Well, you shall see," said he, and opening the door he let the Terrier out. At once the Cat bounded toward her, fawned round her, and then, followed by the Dog, ran about the lawn. But a change came. Some kittens were brought to the house, and the Terrier got much attached to them and they to her. The Tom cat became neglected, and soon appeared to feel it. By and by, to the surprise of every one, the Tom somehow managed to get, and to establish in the hedge of the garden, two kittens, fiery, spitting little things, and carried on no end of depredation on their account. Chickens went; the fur and remains of little Rabbits were often found round the nest, and pieces of meat disappeared from kitchen and larder. This went on for some time, when suddenly the Cat disappeared—had been shot in a wood near by, by a

game-keeper, when hunting to provide for these wild kittens, which were allowed to live in the hedge, as they kept down the Mice in the garden. This may be said to be a case of animal thieving for a loftier purpose than generally obtains, mere demand for food and other necessity.

That nature goes her own way is illustrated by these anecdotes of birds and animals, and by many others even more strange and convincing. The struggle for existence, like the brook, goes on forever, and the survival, if not of the fittest, at least of the strongest, must continue to be the rule of life, so long as the economical problems of existence remain unsolved. Man and beast must be fed. "Manna," to some extent, will always be provided by generous humanitarianism. There will always be John Howards. Occasionally a disinterested, self-abnegating soul like that of John Woolman will appear among us—doing good from love; and, it may be, men like Jonathan Chapman—Johnny Appleseed, he was called from his habit of planting apple seeds wherever he went, as he distributed tracts among the frontier settlers in the early days of western history. He would not harm even a Snake. His heart was right, though his judgment was little better than that of many modern sentimentalists who cannot apparently distinguish the innocuous from the venomous.

It does seem that birds and animals are warranted in committing every act of vandalism that they are accused of. They are unquestionably entitled by every natural right to everything of which they take possession. The farmer has no moral right to deny them a share in the product of his fields and orchards; the gardener is their debtor (at least of the birds), and the government, which benefits also from their industry, should give them its protection. —C. C. M.

THE PETRIFIED FERN.

IN a valley, centuries ago,
Grew a little fernleaf, green and slender,
Veining delicate and fibres tender,
Waving when the wind crept down so low ;
Rushes tall, and moss, and grass grew round it ;
Playful sunbeams darted in and found it,
Drops of dew stole in by night and crowned it ;
But no foot of man e'er came that way,
Earth was young and keeping holiday.

Monster fishes swam the silent main—
Mountains hurled their snowy avalanches,
Giant forests shook their stately branches,
Mammoth creatures stalked across the plain ;
Nature reveled in wild mysteries,
But the little fern was not of these,
Did not number with the hills and trees,
Only grew and waved its sweet wild way—
No one came to note it day by day.

Earth one day put on a frolic mood,
Moved the hills and changed the mighty motion
Of the deep, strong currents of the ocean,
Heaved the rocks, and shook the haughty wood,
Crushed the little fern in soft moist clay,
Covered it and hid it safe away.
Oh, the long, long centuries since that day !
Oh, the agony, Oh, life's bitter cost
Since that useless little fern was lost !

Useless ? Lost ? There came a thoughtful man
Searching Nature's secrets far and deep ;
From a fissure in a rocky steep
He withdrew a stone, o'er which there ran
Fairy pencilings, a quaint design,
Veining, leafage, fibres, clear and fine,
And the fern's life lay in every line.
So, methinks, God hides some souls away,
Sweetly to surprise us some sweet day.

—ANON.

WATER AND ANIMALS.

TO SHOW the importance of water to animal life, we give the opinions of several travelers and scientific men who have studied the question thoroughly.

The Camel, with his pouch for storing water, can go longer without drink than other animals. He doesn't do it from choice, any more than you in a desert would prefer to drink the water that you have carried with you, if you might choose between that and fresh spring water. Major A. G. Leonard, an English transport officer, claims that Camels "should be watered every day, that they can not be trained to do without water, and that, though they can retain one and a half gallons of water in the cells of the stomach, four or five days' abstinence is as much as they can stand, in heat and with dry food, without permanent injury."

Another distinguished English traveler, a Mr. Bryden, has observed that the beasts and birds of the deserts must have private stores of water of which we know nothing. Mr. Bryden, however, has seen the Sand-Grouse of South America on their flight to drink at a desert pool. "The watering process is gone through with perfect order and without overcrowding"—a hint to young people who are hungry and thirsty at their meals. "From eight o'clock to close on ten this wonderful flight continued; as birds drank and departed, others were constantly arriving to take their

places. I should judge that the average time spent by each bird at and around the water was half an hour."

To show the wonderful instinct which animals possess for discovering water an anecdote is told by a writer in the *Spectator*, and the article is republished in the *Living Age* of February 5. The question of a supply of good water for the Hague was under discussion in Holland at the time of building the North Sea Canal. Some one insisted that the Hares, Rabbits, and Partridges knew of a supply in the sand hills, because they never came to the wet "polders" to drink. At first the idea excited laughter. Then one of the local engineers suggested that the sand hills should be carefully explored, and now a long reservoir in the very center of those hills fills with water naturally and supplies the entire town.

All this goes to prove to our mind that if Seals do not apparently drink, if Cormorants and Penguins, Giraffes, Snakes, and Reptiles seem to care nothing for water, some of them do eat wet or moist food, while the Giraffe, for one, enjoys the juices of the leaves of trees that have their roots in the moisture. None of these animals are our common, everyday pets. If they were, it would cost us nothing to put water at their disposal, but that they never drink in their native haunts "can not be proved until the deserts have been explored and the total absence of water confirmed."—*Ex.*



THE HERRING GULL.

JUST how many species of Gulls there are has not yet been determined, but the habits and locations of about twenty-six species have been described. The American Herring Gull is found throughout North America, nesting from Maine northward, and westward throughout the interior on the large inland waters, and occasionally on the Pacific ; south in the winter to Cuba and lower California. This Gull is a common bird throughout its range, particularly coast-wise.

Col. Goss in his "Birds of Kansas," writes as follows of the Herring Gull :

"In the month of June, 1880, I found the birds nesting in large communities on the little island adjacent to Grand Manan ; many were nesting in spruce tree tops from twenty to forty feet from the ground. It was an odd sight to see them on their nests or perched upon a limb, chattering and scolding as approached.

"In the trees I had no difficulty in finding full sets of their eggs, as the egg collectors rarely take the trouble to climb, but on the rocks I was unable to find an egg within reach, the 'egggers' going daily over the rocks. I was told by several that they yearly robbed the birds, taking, however, but nine eggs from a nest, as they found that whenever they took a greater number, the birds so robbed would forsake their nests, or, as they expressed it, cease to lay, and that in order to prevent an over-collection they invariably drop near the nest a little stone or pebble for every egg taken."

The young Gulls grow rapidly. They do not leave their nesting grounds until able to fly, though half-grown birds are sometimes seen on the water that by fright or accident have fallen. The nests are composed of grass and moss. Some of them are large and elaborately made, while

others are merely shallow depressions with a slight lining. Three eggs are usually laid, which vary from bluish-white to a deep yellowish brown, spotted and blotched with brown of different shades. In many cases where the Herring Gull has suffered persecution, it has been known to depart from its usual habit of nesting on the open seashore.

It is a pleasure to watch a flock of Gulls riding buoyantly upon the water. They do not dive, as many suppose, but only immerse the head and neck. They are omnivorous and greedy eaters ; "scavengers of the beach, and in the harbors to be seen boldly alighting upon the masts and flying about the vessels, picking up the refuse matter as soon as it is cast overboard, and often following the steamers from thirty to forty miles from the land, and sometimes much farther. They are ever upon the alert, with a quick eye that notices every floating object or disturbance of the water, and as they herald with screams the appearance of the Herring or other small fishes that often swim in schools at the surface of the water, they prove an unerring pilot to the fishermen who hastily follow with their lines and nets, for they know that beneath and following the valuable catch in sight are the larger fishes that are so intent upon taking the little ones in out of the wet as largely to forget their cunning, and thus make their capture an easy one.

Very large flocks of Gulls, at times appearing many hundreds, are seen on Lake Michigan. We recently saw in the vicinity of Milwaukee a flock of what we considered to be many thousands of these birds, flying swiftly, mounting up, and falling, as if to catch themselves, in wide circles, the sun causing their wings and sides to glisten like burnished silver.

USEFUL BIRDS OF PREY.

IT is claimed that two hundred millions of dollars that should go to the farmer, the gardner, and the fruit grower in the United States are lost every year by the ravages of insects—that is to say, one-tenth of our agricultural product is actually destroyed by them. The Department of Agriculture has made a thorough investigation of this subject, and its conclusions are about as stated. The ravages of the Gypsy Moth in three counties in Massachusetts for several years annually cost the state \$100,000. "Now, as rain is the natural check to drought, so birds are the natural check to insects, for what are pests to the farmer are necessities of life to the bird. It is calculated that an average insectivorous bird destroys 2,400 insects in a year; and when it is remembered that there are over 100,000 kinds of insects in the United States, the majority of which are injurious, and that in some cases a single individual in a year may become the progenitor of several billion descendants, it is seen how much good birds do ordinarily by simple prevention." All of which has reference chiefly to the indispensable-ness of preventing by every possible means the destruction of the birds whose food largely consists of insects.

But many of our so-called birds of prey, which have been thought to be the enemies of the agriculturist and have hence been ruthlessly destroyed, are equally beneficial. Dr. Fisher, an authority on the subject, in referring to the injustice which has been done to many of the best friends of the farm and garden, says:

"The birds of prey, the majority of which labor night and day to destroy the enemies of the husbandman, are persecuted unceasingly. This has especially been the case with the Hawk family, only three of the common in-

land species being harmful. These are the Goshawk, Cooper's Hawk, and the Sharp-shinned Hawk, the first of which is rare in the United States, except in winter. Cooper's Hawk, or the Chicken Hawk, is the most destructive, especially to Doves. The other Hawks are of great value, one of which, the Marsh Hawk, being regarded as perhaps more useful than any other. It can be easily distinguished by its white rump and its habit of beating low over the meadows. Meadow Mice, Rabbits, and Squirrels are its favorite food. The Red-tailed Hawk, or Hen Hawk, is another. It does not deserve the name, for according to Dr. Fisher, while fully sixty-six per cent of its food consists of injurious mammals, not more than seven per cent consists of poultry, and that it is probable that a large proportion of the poultry and game captured by it and the other Buzzard Hawks is made up of old, diseased, or otherwise disabled fowls, so preventing their interbreeding with the sound stock and hindering the spread of fatal epidemics. It eats Ground Squirrels, Rabbits, Mice, and Rats.

The Red-shouldered Hawk, whose picture we present to our readers, is as useful as it is beautiful, in fact ninety per cent. of its food is composed of injurious mammals and insects.

The Sparrow Hawk (See BIRDS, vol. 3, p. 107) is another useful member of this family. In the warm months Grasshoppers, Crickets, and other insects compose its food, and Mice during the rest of the year.

Swainson's Hawk is said to be the great Grasshopper destroyer of the west, and it is estimated that in a month three hundred of these birds save sixty tons of produce that the Grasshopper would destroy.

THE RACCOON.

 AN ACCOUNT of the value of its skin, this interesting animal is much sought after by those who take pride in their skill in securing it. It is commonly known by its abbreviated name of Coon, and as it is of frequent occurrence throughout the United States, every country boy is more or less acquainted with its habits. As an article of food there is much diversity of opinion respecting its merits. It is hunted by some for the sport alone, which is doubtless to be lamented, and by others who enjoy also the pleasure of a palatable stew. As a pet it is also much prized.

The food of the Raccoon consists in the main of small animals and insects. The succulent Oyster also is a favorite article of its diet. It bites off the hinge of the Oyster and scrapes out the animal in fragments with its paws. Like the Squirrel when eating a nut, the Raccoon usually holds its food between its fore paws pressed together and sits upon its hind quarters when it eats. Poultry is also enjoyed by it, and it is said to be as destructive in the farm yard as the Fox, as it only devours the heads of the fowl.

When taken young the Coon is easily tamed, but often becomes blind soon after its capture. This is believed to be produced by the sensitiveness of its eyes, which are intended only to be used by night. As it is frequently awakened by day it suffers so much from the glare of light that its eyes gradually lose their vision. If it must be confined at all it should be in a darkened place. In zoological gardens we have frequently seen several of these animals exposed to the glaring sunlight, the result of ignorance or cruelty, or both.

Unlike the Fox, the Raccoon is at home in a tree, which is the usual refuge when danger is near, and not

being very swift of foot, it is well that it possesses this climbing ability. According to Hallock, the Coons' abode is generally in a hollow tree, oak or chestnut, and when the "juvenile farmer's son comes across a *Coon tree*, he is not long in making known his discovery to friends and neighbors, who forthwith assemble at the spot to secure it." The "sport" is in no sense agreeable from a humane point of view, and we trust it will cease to be regarded as such by those who indulge in it. "The Raccoon makes a heroic struggle and often puts many of his assailants *hors de combat* for many a day, his jaws being strong and his claws sharp."

The young ones are generally from four to eight, pretty little creatures at first and about as large as half-grown Rats. They are very playful, soon become docile and tame, but at the first chance will wander off to the woods and not return. The Coon is a night animal and never travels by day; sometimes it is said, being caught at morning far from its tree and being unable to return thither, it will spend the hours of daylight snugly coiled up among the thickest foliage of some lofty tree-top. It is adroit in its attempts to baffle Dogs, and will often enter a brook and travel for some distance in the water, thus puzzling and delaying its pursuers.

A good sized Raccoon will weigh from fifteen to twenty pounds.

The curiosity of the Raccoon is one of its most interesting characteristics. It will search every place of possible concealment for food, examine critically any object of interest, will rifle a pocket, stand upright and watch every motion of man or animal, and indeed show a marked desire for all sorts of knowledge. Raccoons are apparently happy in captivity when properly cared for by their keepers.

WILD BIRDS IN LONDON.

Their Number and Variety is Increasing Instead of Diminishing.

1932

WHETHER in consequence of the effective working of the Wild Birds' Charter or of other unknown causes, there can be no doubt in the minds of observant lovers of our feathered friends that of late years there has been a great and gratifying increase in their numbers in and around London, especially so, of course, in the vicinity of the beautiful open spaces which do such beneficent work silently in this province of houses. But even in long, unlovely streets, far removed from the rich greenery of the parks, the shabby parallelograms, by courtesy styled gardens, are becoming more and more frequently visited by such pretty shy songsters as Linnets, Blackbirds, Thrushes, and Finches, who, though all too often falling victims to the predatory Cat, find abundant food in these cramped enclosures. Naturally some suburbs are more favored than others in this respect, notably Dulwich, which, though fast losing its beautiful character under the ruthless grip of the builder, still retains some delightful nooks where one may occasionally hear the Nightingale's lovely song in its season.

But the most noticable additions to the bird population of London have been among the Starlings. Their quaint gabble and peculiar minor

whistle may now be heard in the most unexpected localities. Even the towering mansions which have replaced so many of the slums of Westminster find favor in their eyes, for among the thick clustering chimneys which crown these great buildings their slovenly nests may be found in large numbers. In some districts they are so numerous that the irrepressible Sparrow, true London gamin that he is, finds himself in considerable danger of being crowded out. This is perhaps most evident on the sequestered lawns of some of the inns of the court, Gray's Inn Square, for instance, where hundreds of Starlings at a time may now be observed busily trotting about the greensward searching for food. Several long streets come to mind where not a house is without its pair or more of Starlings, who continue faithful to their chosen roofs, and whose descendants settle near as they grow up, well content with their surroundings. House Martins, too, in spite of repeated efforts on the part of irritated landlords to drive them away by destroying their nests on account of the disfigurement to the front of the dwelling, persist in returning year after year and rebuilding their ingenious little mud cells under the eaves of the most modern suburban villas or terrace houses.

—*Pall Mall Gazette.*

1932

THE PIGMY ANTELOPE.

THE Pigmy Antelopes present examples of singular members of the family, in that they are of exceedingly diminutive size, the smallest being no larger than a large Rat, dainty creatures indeed. The Pigmy is an inhabitant of South Africa, and its habits are said to be quite similar to those of its brother of the western portion of North America.

The Antelope is a very wary animal, but the sentiment of curiosity is implanted so strongly in its nature

that it often leads it to reconnoitre too closely some object which it cannot clearly make out, and its investigations are pursued until "the dire answer to all inquiries is given by the sharp 'spang' of the rifle and the answering 'spat' as the ball strikes the beautiful creatures flank." The Pigmy Antelope is not hunted, however, as is its larger congener, and may be considered rather as a diminutive curiosity of Nature's delicate workmanship than as the legitimate prey of man.

BIRDS OF ALASKA.

No sooner had the twilight settled over the island than new bird voices called from the hills about us. The birds of the day were at rest, and their place was filled with the night denizens of the island. They came from the dark recesses of the forests, first single stragglers, increased by midnight to a stream of eager birds, passing to and fro from the sea. Many, attracted by the glow of the burning logs, altered their course and circled about the fire a few times and then sped on. From their notes we identified the principal night prowlers as the Cassin's Auklet, Rhinoceros Auk, Murrelet, and varieties of Petrel. All through the night our slumbers were frequently disturbed by birds alighting on the sides of the tent, slipping down with great scratching into the grass below, where our excited Dog took a hand in the matter, daylight often finding our tent strewn with birds he had captured during the night. When he found time to sleep I do not know. He was after birds the entire twenty-four hours.

In climbing over the hills of the island we discovered the retreats of these night birds, the soil everywhere

through the deep wood being fairly honeycombed with their nesting burrows. The larger tunnels of the Rhinoceros Auks were, as a rule, on the slopes of the hill, while the little burrows of the Cassin's Auklet were on top in the flat places. We opened many of their queer abodes that ran back with many turns to a distance of ten feet or more. One or both birds were invariably found at the end, covering their single egg, for this species, like many other sea birds, divide the duties of incubation, both sexes doing an equal share, relieving each other at night.

The Puffins nested in burrows also, but lower down—often just above the surf. One must be very careful, indeed, how he thrusts his hand into their dark dens, for should the old bird chance to be at home, its vise-like bill can inflict a very painful wound. The rookeries of the Murres and Cormorants were on the sides of steep cliffs overhanging the sea. Looking down from above, hundreds of eggs could be seen, gathered along the narrow shelves and chinks in the rocks, but accessible only by means of a rope from the top.—*Outing*.

THE RED-SHOULDERED HAWK.

You have heard of me before. I am the Hawk whose cry Mr. Blue Jay imitated, as you will remember, in the story "The New Tenants," published in BIRDS.

Kee-oe, kee-oe, kee-oe, that is my cry, very loud and plaintive; they say I am a very noisy bird; perhaps that is the reason why Mr. Blue Jay imitates me more than he does other Hawks.

I am called Chicken Hawk, and Hen Hawk, also, though I don't deserve either of those names. There are members of our family, and oh, what a lot of us there are—as numerous as the Woodpeckers—who do drop down into the barnyards and right before the farmer's eyes carry off a Chicken. Red Squirrels, to my notion, are more appetizing than Chickens; so are Mice, Frogs, Centipedes, Snakes, and Worms. A bird once in a while I like for variety, and between you and me, if I am hungry, I pick up a chicken now and then, that has strayed outside the barnyard. But only *occasionally*, remember, so that I don't deserve the name of Chicken Hawk at all, do I?

Wooded swamps, groves inhabited by Squirrels, and patches of low timber are the places in which we make our

homes. Sometimes we use an old crow's nest instead of building one; we retouch it a little and put in a soft lining of feathers which my mate plucks from her breast. When we build a new nest, it is made of husks, moss, and strips of bark, lined as the building progresses with my mate's feathers. Young lady Red-shouldered Hawks lay three and sometimes four eggs, but the old lady birds lay only two.

Somehow Mr. Blue Jay never sees a Hawk without giving the alarm, and on he rushes to attack us, backed up by other Jays who never fail to go to his assistance. They often assemble in great numbers and actually succeed in driving us out of the neighborhood. Not that we are afraid of them, oh no! We know them to be great cowards, as well as the crows, who harass us also, and only have to turn on our foes to put them to rout. Sometimes we do turn, and seizing a Blue Jay, sail off with him to the nearest covert; or in mid air strike a Crow who persistently follows us. But as a general thing we simply ignore our little assailants, and just fly off to avoid them.



THE RED-SHOULDERED HAWK.

THE Hawk family is an interesting one and many of them are beautiful. The Red-shouldered Hawk is one of the finest specimens of these birds, as well as one of the most useful. Of late years the farmer has come to know it as his friend rather than his enemy, as formerly. It inhabits the woodlands where it feeds chiefly upon Squirrels, Rabbits, Mice, Moles, and Lizards. It occasionally drops down on an unlucky Duck or Bob White, though it is not quick enough to catch the smaller birds. It is said to be destructive to domestic fowls raised in or near the timber, but does not appear to search for food far away from its natural haunts. As it is a very noisy bird, the birds which it might destroy are warned of its approach, and thus protect themselves.

During the early nesting season its loud, harsh *kee-oo* is heard from the perch and while in the air, often keeping up the cry for a long time without intermission. Col. Goss says that he collected at Neosho Falls, Kansas, for several successive years a set of the eggs of this species from a nest in the forks of a medium sized oak. In about nine days after each robbery the birds would commence laying again, and he allowed them to hatch and rear their young. One winter during his absence the tree was cut down, but this did not discourage the birds, or cause them to forsake the place, for on approach of spring he found them building a nest not over ten rods from

the old one, but this time in a large sycamore beyond reach. This seemed to him to indicate that they become greatly attached to the grounds selected for a home, which they vigilantly guard, not permitting a bird of prey to come within their limits.

This species is one of the commonest in the United States, being especially abundant in the winter, from which it receives the name of Winter Falcon. The name of Chicken Hawk is often applied to it, though it does not deserve the name, its diet being of a more humble kind.

The eggs are usually deposited in April or May in numbers of three or four — sometimes only two. The ground color is bluish, yellowish-white or brownish, spotted, blotched and dotted irregularly with many shades of reddish brown. Some of them are strikingly beautiful. According to Davie, to describe all the shades of reds and browns which comprise the variation would be an almost endless task, and a large series like this must be seen in order to appreciate how much the eggs of this species vary.

The flight of the Red-shouldered Hawk is slow, but steady and strong with a regular beat of the wings. They take delight in sailing in the air, where they float lightly and with scarcely a notable motion of the wings, often circling to a great height. During the insect season, while thus sailing, they often fill their craws with grass-hoppers, that, during the after part of the day, also enjoy an air sail.

THE DOVES OF VENICE.

VENICE, the pride of Italy of old, aside from its other numerous curiosities and antiquities, has one which is a novelty indeed. Its Doves on the San Marco Place are a source of wonder and amusement to every lover of animal life. Their most striking peculiarity is that they fear no mortal man, be he stranger or not. They come in countless numbers, and, when not perched on the far-famed bell tower, are found on the flags of San Marco Square. They are often misnamed Pigeons, but as a matter of fact they are Doves of the highest order. They differ, however, from our wild Doves in that they are fully three times as large, and twice as large as our best domestic Pigeon. Their plumage is of a soft mouse color relieved by pure white, and occasionally one of pure white is found, but these are rare. Hold out to them a handful of crumbs and without fear they will come, perch on your hand or shoulder and eat with thankful coos. To strangers this is indeed a pleasing sight, and demonstrates the lack of fear of animals when they are treated humanely, for none would dare to injure the doves of San Marco. He would probably forfeit his life were he to injure one intentionally. And what beggars these Doves of San Marco are! They will crowd around, and push and coo with their soft soothing voices, until you can withstand them no longer, and invest a few centimes in bread for their benefit. Their bread, by the way, is sold by an Italian, who must certainly be in collusion with the Doves, for whenever a stranger makes his appearance, both Doves and bread vender are at hand to beg.

The most remarkable fact in connection with these Doves is that they will collect in no other place in large

numbers than San Marco Square, and in particular at the vestibule of San Marco Church. True, they are found perched on buildings throughout the entire city, and occasionally we will find a few in various streets picking refuse, but they never appear in great numbers outside of San Marco Square. The ancient bell tower, which is situated on the west side of the place, is a favorite roosting place for them, and on this perch they patiently wait for a foreigner, and proceed to bleed him after approved Italian fashion.

There are several legends connected with the Doves of Venice, each of which attempts to explain the peculiar veneration of the Venetian and the extreme liberty allowed these harbingers of peace. The one which struck me as being the most appropriate is as follows:

Centuries ago Venice was a free city, having her own government, navy, and army, and in a manner was considered quite a power on land and sea. The city was ruled by a Senate consisting of ten men, who were called Doges, who had absolute power, which they used very often in a despotic and cruel manner, especially where political prisoners were concerned. On account of the riches the city contained, and also its values as a port, Venice was coveted by Italy and neighboring nations, and, as a consequence, was often called upon to defend itself with rather indifferent success. In fact, Venice was conquered so often, first by one and then another, that Venetians were seldom certain of how they stood. They knew not whether they were slave or victor. It was during one of these sieges that the incident of the Doves occurred. The city had been besieged for a long time by Italians, and matters were coming to such a pass that a surrender was abso-

lutely necessary on account of lack of food. In fact, the Doges had issued a decree that on the morrow the city should surrender unconditionally.

All was gloom and sorrow, and the populace stood around in groups on the San Marco discussing the situation and bemoaning their fate, when lo! in the eastern sky there appeared a dense cloud rushing upon the city with the speed of the wind. At first consternation reigned supreme, and men asked each other: "What new calamity is this?" As the cloud swiftly approached it was seen to be a vast number of Doves, which, after hovering over the San Marco Place for a moment, gracefully settled down upon the flagstones and approached the men without fear. Then there arose a queer cry, "The Doves! The Doves of San Marco!" It appears that some years before this a sage had predicted stormy times for Venice, with much suffering and strife, but, when all seemed lost, there would appear a multitude of Doves, who would bring Venice peace and happiness. And so it came to pass that the next day, instead of attacking, the besiegers left, and Venice was free again. The prophet also stated that, so long as the Doves remained at Venice prosperity would reign supreme, but that there would come a day when the Doves would leave just as they had

come, and Venice would pass into oblivion. That is why Venetians take such good care of their Doves.

You will not find this legend in any history, but I give it just as it was told me by a guide, who seemed well versed in hair-raising legends. Possibly they were manufactured to order by this energetic gentleman, but they sounded well nevertheless. Even to this day the old men of Venice fear that some morning they will awake and find their Doves gone.

There in the shadow of the famous bell-tower, with the stately San Marco church on one side and the palace of the cruel and murderous Doges on the other, we daily find our pretty Doves coaxing for bread. Often you will find them peering down into the dark passage-way in the palace, which leads to the dungeons underneath the Grand Canal. What a boon a sight of these messengers of peace would have been to the doomed inmates of these murder-reeking caves. But happily they are now deserted, and are used only as a source of revenue, which is paid by the inquisitive tourist.

Venice still remains as of old. She never changes, and the Doves of San Marco will still remain. May we hope, with the sages of Venice, that they may remain forever.—*Lebert, in Cincinnati Commercial Gazette.*

BUTTERFLIES.

IT may appear strange, if not altogether inappropriate to the season, that "the fair fragile things which are the resurrection of the ugly, creeping caterpillars" should be almost as numerous in October as in the balmy month of July. Yet it is true, and early October, in some parts of the country, is said to be perhaps the best time of the year for the investigating student and observer of Butterflies. While not quite so numerous, perhaps, many of the species are in more perfect condition, and the variety is still intact. Many of them come and remain until frost, and the largest Butterfly we have, the Archipus, does not appear until the middle of July, but after that is constantly with us, floating and circling on the wing, until October. How these delicate creatures can endure even the chill of autumn days is one of the mysteries.

Very curious and interesting are the Skippers, says *Current Literature*. They are very small insects, but their bodies are robust, and they fly with great rapidity, not moving in graceful, wavy lines as the true Butterflies do, but skipping about with sudden, jerky motions. Their flight is very short, and almost always near the ground. They can never be mistaken, as their peculiar motion renders their identification easy. They are seen at their best in August and September. All June and July Butterflies are August and September Butterflies, not so numerous in some instances, perhaps, but still plentiful, and vying with the rich hues of the changing autumnal foliage.

The "little wood brownies," or Quakers, are exceedingly interesting.

Their colors are not brilliant, but plain, and they seek the quiet and retirement of the woods, where they flit about in graceful circles over the shady beds of ferns and woodland grasses.

Many varieties of the Vanessa are often seen flying about in May, but they are far more numerous and perfect in July, August, and September. A beautiful Azure-blue Butterfly, when it is fluttering over flowers in the sunshine, looks like a tiny speck of bright blue satin. Several other small Butterflies which appear at the same time are readily distinguished by the peculiar manner in which their hind wings are tailed. Their color is a dull brown of various shades, marked in some of the varieties with specks of white or blue.

"Their presence in the gardens and meadows," says a recent writer, "and in the fields and along the river-banks, adds another element of gladness which we are quick to recognize, and even the plodding wayfarer who has not the honor of a single intimate acquaintance among them might, perhaps, be the first to miss their circlings about his path. As roses belong to June, and chrysanthemums to November, so Butterflies seem to be a joyous part of July. It is their gala-day, and they are everywhere, darting and circling and sailing, dropping to investigate flowers and overripe fruit, and rising on buoyant wings high into the upper air, bright, joyous, airy, ephemeral. But July can only claim the larger part of their allegiance, for they are wanderers into all the other months, and even occasionally brave the winter with torn and faded wings."

THE FOX.

"A sly dog."

Somehow people always say that when they see a Fox. I'd rather they would call me that than stupid, however. Do I look stupid in my picture?

"Look pleasant," said the man when taking my photograph for BIRDS, and I flatter myself I did—and intelligent, too. Look at my brainy head, my delicate ears—broad below to catch every sound, and tapering so sharply to a point that they can shape themselves to every wave of sound. Note the crafty calculation and foresight of my low, flat brow, the resolute purpose of my pointed nose; my eye deep set—like a robber's—my thin cynical lips, and mouth open from ear to ear. You couldn't find a better looking Fox if you searched the world over.

I can leap, crawl, run, and swim, and walk so noiselessly that even the dead leaves won't rustle under my feet. It takes a deal of cunning for a Fox to get along in this world, I can tell you. I'd go hungry if I didn't plan and observe the habits of other creatures. For instance: I love Fish. When I want one for my supper off I trot to the nearest stream, and standing very quiet, watch till I spy a nice, plump trout in the

clear water. A leap, a snap, and it is all over with Mr. Trout.

Another time I feel as though I'd like a crawfish. I see one snoozing by his hole near the water's edge. I drop my fine, bushy tail into the water and tickle him on the ear. That makes him furious—nobody likes to be wakened from a nap that way—and out he darts at the tail; snap go my jaws, and Mr. Crawfish is crushed in them, shell and all.

Between you and me, I consider that a very clever trick, too. Don't you?

Summer is my favorite season of the year. How I love the green fields, the ripening grain, the delicious fruits, for then the Rabbits prick up their long ears, and thinking themselves out of danger, run along the hillside; then the quails skulk in the wheat stubble, and the birds hop and fly about the whole day long. I am very fond of Rabbits, Quails, and other Birds. They make a very satisfactory meal. For dessert I have only to sneak into an orchard and eat my fill of apples, pears, and grapes. You perceive I have very good reason for liking the summer. It's the merriest time of the year for me, and my cubs. They grow fat and saucy, too.

THE GRAY FOX.

THE only Foxes that are hunted (the others only being taken by means of traps or poison) are the Red and Gray species.

The Gray Fox is a more southern species than the Red and is rarely found north of the state of Maine. Indeed it is said to be not common anywhere in New England. In the southern states, however, it wholly replaces the Red Fox, and, according to Hallock, one of the best authorities on game animals in this country, causes quite as much annoyance to the farmer as does that proverbial and predatory animal, the terror of the hen-roost and the smaller rodents. The Gray Fox is somewhat smaller than the Red and differs from him in being wholly dark gray "mixed hoary and black." He also differs from his northern cousin in being able to climb trees. Although not much of a runner, when hard pressed by the dog he will often ascend the trunk of a leaning tree, or will even climb an erect one, grasping the trunk in his arms as would a Bear. Nevertheless the Fox is not at home among the branches, and looks and no doubt feels very much out of place while in this predicament. The ability to climb, however, often saves him from the hounds, who are thus thrown off the scent and Reynard is left to trot home at his leisure.

Foxes live in holes of their own making, generally in the loamy soil of a side hill, says an old Fox hunter, and the she-Fox bears four or five cubs at a litter. When a fox-hole is discovered by the Farmers they assemble and proceed to dig out the inmates who have lately, very likely, been making havoc among the hen-roosts. An amusing incident, he relates, which came under his observation a few years ago will bear relating. A farmer

discovered the lair of an old dog Fox by means of his hound, who trailed the animal to his hole. This Fox had been making large and nightly inroads into the poultry ranks of the neighborhood, and had acquired great and unenviable notoriety on that account. The farmer and two companions, armed with spades and hoes, and accompanied by the faithful hound, started to dig out the Fox. The hole was situated on the sandy slope of a hill, and after a laborious and continued digging of four hours, Reynard was unearthed and he and Rep, the dog, were soon engaged in deadly strife. The excitement had waxed hot, and dog, men, and Fox were all struggling in a promiscuous melee. Soon a burly farmer watching his chance strikes wildly with his hoe-handle for Reynard's head, which is scarcely distinguishable in the maze of legs and bodies. The blow descends, but alas! a sudden movement of the hairy mass brings the fierce stroke upon the faithful dog, who with a wild howl relaxes his grasp and rolls with bruised and bleeding head, faint and powerless on the hillside. Reynard takes advantage of the turn affairs have assumed, and before the gun, which had been laid aside on the grass some hours before, can be reached he disappears over the crest of the hill.

Hallock says that an old she-Fox with young, to supply them with food, will soon deplete the hen-roost and destroy both old and great numbers of very young chickens. They generally travel by night, follow regular runs, and are exceedingly shy of any invention for their capture, and the use of traps is almost futile. If caught in a trap, they will gnaw off the captured foot and escape, in which respect they fully support their ancient reputation for cunning.



AMERICAN GRAY FOX.

Copyright by
Nature Study Pub. Co., 1908, Chicago.

MISCELLANY.

RURAL BIRD LIFE IN INDIA.—“Nothing gives more delight,” writes Mr. Caine, “in traveling through rural India than the bird-life that abounds everywhere; absolutely unmolested, they are as tame as a poultry yard, making the country one vast aviary. Yellow-beaked Minas, Ringdoves, Jays, Hoopoes, and Parrots take dust baths with the merry Palm-squirrel in the roadway, hardly troubling themselves to hop out of the way of the heavy bull-carts; every wayside pond and lake is alive with Ducks, Wild Geese, Flamingoes, Pelicans, and waders of every size and sort, from dainty red-legged beauties the size of Pigeons up to the great unwieldy Cranes and Adjutants five feet high. We pass a dead Sheep with two loathsome vultures picking over the carcass, and presently a brood of fluffy young Partridges with father and mother in charge look at us fearlessly within ten feet of our whirling carriage. Every village has its flock of sacred Peacocks pacing gravely through the surrounding gardens and fields, and Woodpeckers and Kingfishers flash about like jewels in the blazing sunlight.”

WARNING COLORS.—Very complete experiments in support of the theory of warning colors, first suggested by Bates and also by Wallace, have been made in India by Mr. Finn, says *The Independent*. He concludes that there is a general appetite for Butterflies among insectivorous birds, though they are rarely seen when wild to attack them; also that many, probably most birds, dislike, if not intensely, at any rate in comparison with other Butterflies, those of the Danais genus and three other kinds, including a species of Papilio, which is the most distasteful. The mimics of these Butterflies are relatively palatable. He

found that each bird has to separately acquire its experience with bad-tasting Butterflies, but well remembers what it learns. He also experimented with Lizards, and noticed that, unlike the birds, they ate the nauseous as well as other Butterflies.

INCREASE IN ZOOLOGICAL PRESERVES IN THE UNITED STATES.—The establishment of the National Zoological Park, Washington, has led to the formation of many other zoological preserves in the United States. In the western part of New Hampshire is an area of 26,000 acres, established by the late Austin Corbin, and containing 74 Bison, 200 Moose, 1,500 Elk, 1,700 Deer of different species, and 150 Wild Boar, all of which are rapidly multiplying. In the Adirondacks, a preserve of 9,000 acres has been stocked with Elk, Virginia Deer, Muledeer, Rabbits, and Pheasants. The same animals are preserved by W. C. Whitney on an estate of 1,000 acres in the Berkshire Hills, near Lenox, Mass., where also he keeps Bison and Antelope. Other preserves are Nelhasane Park, in the Adirondacks, 8,000 acres; Tranquillity Park, near Allamuchy, N. J., 4,000 acres; the Alling preserve, near Tacoma, Washington, 5,000 acres; North Lodge, near St. Paul, Minn., 400 acres; and Furlough Lodge, in the Catskills, N. Y., 600 acres.

ROBINS ABUNDANT.—Not for many years have these birds been so numerous as during 1898. Once, under some wide-spreading willow trees, where the ground was bare and soft, we counted about forty Red-breasts feeding together, and on several occasions during the summer we saw so many in flocks, that we could only guess at the number. When unmolested, few birds become so tame and none are more interesting.

THE GRAY SQUIRREL.

EAST of the Missouri River the Gray Squirrel is found almost everywhere, and is perhaps the most common variety. Wherever there is timber it is almost sure to be met with, and in many localities is very abundant, especially where it has had an opportunity to breed without unusual disturbance. Its usual color is pale gray above and white or yellowish white beneath, but individuals of the species grade from this color through all the stages to jet black. Gray and black Squirrels are often found associating together. They are said to be in every respect alike, in the anatomy of their bodies, habits, and in every detail excepting the color, and by many sportsmen they are regarded as distinct species, and that the black form is merely due to melanism, an anomaly not uncommon among animals. Whether this be the correct explanation may well be left to further scientific observation.

Like all the family, the Gray Squirrels feed in the early morning just after sunrise and remain during the middle of the day in their hole or nest. It is in the early morning or the late afternoon, when they again appear in search of the evening meal, that the wise hunter lies in wait for them. Then they may be heard and seen playing and chattering together till twilight. Sitting upright and motionless on a log the intruder will rarely be discovered by them, but at the slightest movement they scamper away, hardly to return. This fact is a great advantage of by the sportsmen, and, says an observer, be he at all familiar with the runways of the Squirrels at any particular locality he may sit by the path and bag a goodly number. Gray and Black Squirrels generally breed twice during the spring and summer, and have several young

at a litter. The young mature in August and September.

We have been told that an incident of migration of Squirrels of a very remarkable kind occurred a good many years ago, caused by lack of mast and other food, in New York State. When the creatures arrived at the Niagara river, their apparent destination being Canada, they seemed to hesitate before attempting to cross the swift running stream. The current is very rapid, exceeding seven miles an hour. They finally ventured in the water, however, and with tails spread for sails, succeeded in making the opposite shore, but more than a mile below the point of entrance. They are better swimmers than one would fancy them to be, as they have much strength and endurance. We remember when a boy seeing some mischievous urchins repeatedly throw a tame Squirrel into deep water for the cruel pleasure of watching it swim ashore. The "sport" was soon stopped, however, by a passerby, who administered a rebuke that could hardly be forgotten.

Squirrels are frequently domesticated and become as tame as any household tabby. Unfortunately Dogs and Cats seem to show a relentless enmity toward them, as they do toward all rodents. The Squirrel is willing to be friendly, and no doubt would gladly affiliate with them, but the instinct of the canine and the feline impels them to exterminate it. We once gave shelter and food to a strange Cat and was rewarded by seeing it fiercely attack and kill a beautiful white Rabbit which until then had had the run of the yard and never before been molested. Until we shall be able to teach the beasts of the field something of our sentimental humanitarianism we can scarcely expect to see examples of cruelty wholly disappear.



From col. Chi. Acad. Sciences.

GRAY SQUIRREL.
♂ ♀ Life-size.

Wm. F. Powell

AH ME!

I killed a Robin—the little thing,
With scarlet breast on a glossy wing,
That comes in the apple tree to sing.

I flung a stone as he twittered there,
I only meant to give him a scare,
But off it went—and hit him square.

A little flutter—a little cry—
Then on the ground I saw him lie.
I didn't think he was going to die.

But as I watched him I soon could see
He never would sing for you or me
Any more in the apple tree.

Never more in the morning light,
Never more in the sunshine bright,
Trilling his song in gay delight.

And I'm thinking, every summer day,
How never, never, I can repay
The little life that I took away.

—SYDNEY DAYRE, in *The Youth's Companion*.

THE PECTORAL SANDPIPER.

MORE than a score of Sandpipers are described in the various works on ornithology. The one presented here, however, is perhaps the most curious specimen, distributed throughout North, Central, and South America, breeding in the Arctic regions. It is also of frequent occurrence in Europe. Low, wet lands, muddy flats, and the edges of shallow pools of water are its favorite resorts. The birds move in flocks, but, while feeding, scatter as they move about, picking and probing here and there for their food, which consists of worms, insects, small shell fish, tender rootlets, and birds; "but at the report of a gun," says Col. Goss, "or any sudden fright, spring into the air, utter a low whistling note, quickly bunch together, flying swift and strong, usually in a zigzag manner, and when not much hunted often circle and drop back within shot; for they are not naturally a timid or suspicious bird, and when quietly and slowly approached, sometimes try to hide by squatting close to the ground."

Of the Pectoral Sandpiper's nesting habits, little has been known until recently. From Mr. Nelson's interesting description, in his report upon "Natural History Collections in Alaska," we quote as follows: "The night of May 24, 1889, I lay wrapped in my blanket, and from the raised flap of the tent looked out over as dreary a cloud-covered landscape as can be imagined. As my eyelids began to droop and the scene to become indistinct, suddenly a low, hollow, booming note struck my ear and sent

my thoughts back to a spring morning in northern Illinois, and to the loud vibrating tones of the Prairie Chickens. [See BIRDS AND ALL NATURE, Vol. IV, p. 18.] Again the sound arose, nearer and more distinct, and with an effort I brought myself back to the reality of my position, and, resting upon one elbow, listened. A few seconds passed, and again arose the note; a moment later I stood outside the tent. The open flat extended away on all sides, with apparently not a living creature near. Once again the note was repeated close by, and a glance revealed its author. Standing in the thin grass ten or fifteen yards from me, with its throat inflated until it was as large as the rest of the bird, was a male Pectoral Sandpiper. The succeeding days afforded opportunity to observe the bird as it uttered its singular notes, under a variety of situations, and at various hours of the day, or during the light Arctic night. The note is deep, hollow, and resonant, but at the same time liquid and musical, and may be represented by a repetition of the syllables *too-u, too-u, too-u, too-u, too-u, too-u.*" The bird may frequently be seen running along the ground close to the female, its enormous sac inflated.

Mr. Murdock says the birds breed in abundance at Point Barrow, Alaska, and that the nest is always built in the grass, with a preference for high and dry localities. The nest was like that of the other waders, a depression in the ground, lined with a little dry grass. The eggs are four, of pale purplish-gray and light neutral tint. It is sometimes called Grass Snipe.



From col. Chi. Acad. Sciences.

PECTORAL SANDPIPER.

Copyright by

EYES.

By W. E. WATT.

Why was the sight
To such a tender ball as th' eye confined,
So obvious and so easy to be quenched,
And not, as feeling, through all parts diffused;
That she might look at will through every pore?—MILTON.

"But bein' only eyes, you see, my wision's limited."—SAM WELLER.

THE REASON we know anything at all is that various forms of vibration are capable of affecting our organs of sense. These agitate the brain, the mind perceives, and from perception arise the higher forms of thought. Perhaps the most important of the senses is sight. It ranges in power from the mere ability to perceive the difference between light and darkness up to a marvelous means of knowing the nature of objects of various forms and sizes, at both near and remote range.

One the simplest forms of eyes is found in the Sea-anemone. It has a colored mass of pigment cells and refractive bodies that break up the light which falls upon them, and it is able to know day and night. An examination of this simple organ leads one to think the scientist not far wrong who claimed that the eye is a development from what was once merely a particular sore spot that was sensitive to the action of light. The protophyte, *Euglena varidis*, has what seems to be the least complicated of all sense organs in the transparent spot in the front of its body.

We know that rays of light have power to alter the color of certain substances. The retina of the eye is changed in color by exposure to continued rays of light. Frogs in whose eyes the color of the retina has

apparently been all changed by sunshine are still able to take a fly accurately and to recognize certain colors

Whether the changes produced by light upon the retina are all chemical or all physical or partly both remains open to discussion.

An interesting experiment was performed by Professor Tyndall proving that heat rays do not affect the eye optically. He was operating along the line of testing the power of the eye to transmit to the sensorium the presence of certain forms of radiant energy. It is well known that certain waves are unnoticed by the eye but are registered distinctly by the photographic plate, and he first showed beyond doubt that heat waves as such have no effect upon the retina. By separating the light and heat rays from an electric lantern and focusing the latter, he brought their combined energy to play where his own eye could be placed directly in contact with them, first protecting the exterior of his eye from the heat rays. There was no sensation whatever as a result, but when, directly afterward, he placed a sheet of platinum at the convergence of the dark rays it quickly became red hot with the energy which his eye was unable to recognize.

The eye is a camera obscura with a very imperfect lens and a receiving plate irregularly sensitized; but it has marvelous powers of quick adjust-

ment. The habits of the animal determine the character of the eye. Birds of rapid flight and those which scan the earth minutely from lofty courses are able to adjust their vision quickly to long and short range. The eye of the Owl is subject to his will as he swings noiselessly down upon the Mouse in the grass. The nearer the object the more the eye is protruded and the deeper its form from front to rear.

The human eye adjusts its power well for small objects within a few inches and readily reaches out for those several miles away. A curious feature is that we are able to adjust the eye for something at long range in less time than for something close at hand. If we are reading and someone calls our attention to an object on the distant hillside, the eye adjusts itself to the distance in less than a second, but when we return our vision to the printed page several seconds are consumed in the re-adjustment.

The Condor of the Andes has great powers of sight. He wheels in beautiful curves high in the air scrutinizing the ground most carefully and all the time apparently keeping track of all the other Condors within a range of several miles. No sooner does one of his kind descend to the earth than those near him shoot for the same spot hoping the find may be large enough for a dinner party. Others soaring at greater distances note their departure and follow in great numbers so that when the carcass discovered by one Condor proves to be a large one, hundreds of these huge birds congregate to enjoy the feast. The Condor's eyes have been well compared to opera glasses, their extension and contraction are so great.

The Eagle soars towards the sun with fixed gaze and apparent fullness of enjoyment. This would ruin his sight were it not for the fact that he and all other birds are provided with

an extra inner eyelid called the nictitating membrane which may be drawn at will over the eye to protect it from too strong a light. Cuvier made the discovery that the eye of the Eagle, which had up to his time been supposed of peculiarly great strength to enable it to feast upon the sun's rays, is closed during its great flights just as the eye of the barnyard fowl is occasionally rested by the use of this delicate semi-transparent membrane. Several of the mammals, among them being the horse, are equipped with such an inner eyelid.

One of my most striking experiences on the ocean was had when I pulled in my first Flounder and found both of his eyes on the same side of his head. All Flat-fish are similarly equipped. On the side which glides over the bottom of the sea, the Halibut, Turbot, Plaice, and Sole are almost white, the upper side being dark enough to be scarcely distinguishable from the ground. On the upper side are the two eyes, while the lower side is blind.

When first born the fish swims upright with a slight tendency to favor one side; its eyes are on opposite sides of the head, as in most vertebrates and the head itself is regular. With age and experience in exploring the bottom on one side, the under eye refuses to remain away from the light and gradually turns upward, bringing with it the bones of the skull to such an extent that the adult Flatfish becomes the apparently deformed creature that appears in our markets as a regular product of the deep.

The eyeless inhabitant of the streams in Mammoth Cave presents a curious instance of the total loss of a sense which remains unused. These little fishes are not only without sight but are also almost destitute of color and markings, the general appearance being much like that of a fish with the skin taken off for the frying pan.

The eyes of fishes generally are so nearly round that they may be used with good effect as simple microscopes and have considerable magnifying power. Being continually washed with the element in which they move, they have no need for winking and the lachrymal duct which supplies tears to the eyes of most of the animal kingdom is entirely wanting. Whales have no tear glands in their eyes, and the whole order of Cetacea are tearless.

Among domestic animals there is considerable variety of structure in the eye. The pupil is usually round, but in the small Cats it is long vertically, and in the Sheep, in fact, in all the cud chewers and many other grass eaters, the pupil is long horizontally.

Insects present a wonderful array of eyes. These are not movable, but the evident purpose is that there shall be an eye in readiness in whatever direction the insect may have business. The common Ant has fifty six-cornered jewels set advantageously in his little head and so arranged as to take in everything that pertains to the pleasure of the industrious little creature. As the Ant does not move about with great rapidity he is less in need of many eyes than the House-fly which calls into play four thousand brilliant facets, while the Butterfly is supplied with about seventeen thousand. The most remarkable of all is the blundering Beetle which bangs his head against the wall with twenty-five thousand eyes wide open.

THE HUNTED SQUIRREL.

THEN as a nimble Squirrel from the wood
Ranging the hedges for his filbert food
Sits pertly on a bough, his brown nuts cracking
And from the shell the sweet white kernel taking ;
Till with their crooks and bags a sort of boys
To share with him come with so great a noise
That he is forced to leave a nut nigh broke,
And for his life leap to a neighbor oak,
Thence to a beech, thence to a row of ashes ;
Whilst through the quagmires and red water plashes
The boys run dabbling through thick and thin.
One tears his hose, another breaks his slin ;
This, torn and tattered, hath with much ado
Got by the briars ; and that hath lost his shoe ;
This drops his band ; that headlong falls for haste ;
Another cries behind for being last ;
With sticks and stones and many a sounding holloa
The little fool with no small sport they follow,
Whilst he from tree to tree, from spray to spray
Gets to the woods and hides him in his dray.

—WILLIAM BROWNE,
Old English Poet

SUMMARY.

Page 86.

AMERICAN HERRING GULL.—*Larus argentatus smithsonianus*.

RANGE—North America generally. Breeds on the Atlantic coast from Maine northward.

NEST—On the ground, on merely a shallow depression with a slight lining; occasionally in trees, sixty or seventy-five feet from the ground.

EGGS—Three, varying from bluish white to deep yellowish brown, irregularly spotted and blotched with brown of different shades.

Page 90.

AMERICAN RACCOON.—*Procyon lotor*.

Other name: Coon.

RANGE—North America.

Page 94.

PIGMY ANTELOPE.—*Antelope pigmæa*.

RANGE—South Africa.

Page 98.

RED - SHOULDERED HAWK. — *Buteo lineatus*.

RANGE—Eastern North America, north to Nova Scotia, west to the edge of the Great Plains.

NEST—In the branches of lofty oaks, pines, and sycamores. In mountainous regions the nest is often placed on the narrow ledges of cliffs.

EGGS—Three or four; bluish, yellowish white, or brownish, spotted, blotched, and dotted irregularly with many shades of reddish brown.

Page 107.

AMERICAN GRAY FOX.—*Vulpes virginianus*.

RANGE—Throughout the United States.

Page 111.

AMERICAN GRAY SQUIRREL.—*Sciurus carolinensis*.

RANGE—United States generally.

Page 115.

PECTORAL SANDPIPER.—*Tringa maculata*.

RANGE—North, Central, and South America, breeding in the Arctic regions. Of frequent occurrence in Europe.

NESTS—In tufts of grass.

EGGS—Four, of a drab ground color, with a greenish shade in some cases, and are spotted and blotched with umber brown, varying in distribution on different specimens, as is usual among waders' eggs.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IV.

OCTOBER, 1898.

No. 4.

EARS.

BY W. E. WATT.

THE air is an elastic fluid surrounding the earth. The motions of things whether alive or not, set it in a state of vibration that rarely ceases. At all times and in all places it is pulsing responsively to all that is going on.

Animals are interested in what is moving about them. It may mean life or death, pleasure or agony, and most animals are keen to know which is for them at any given period. They are therefore equipped with organs that respond to these waves of the air. They are variously equipped, some hearing certain sounds feebly where others are acute to them and deeply moved. Some sounds are full of moment to one organism arousing it to nervous activity while another organism knows nothing of what is so distinctly heard by the first.

Can a Mule hear more than a Mouse is a question which has agitated many young people who have considered the length of the former's ear and its versatility. A series of experiments once conducted in youthful sport by the writer, seemed to settle the matter that each can hear sounds which are unnoticed by the other, and that the ear of the Mouse is much better adapted in hearing powers to the occupation of the Mouse than is that of his long eared neighbor. Certain shrill sounds of whatever degree

of loudness, cannot be heard by the Mule even when oats might be secured by attending to them, while distant sounds of a heavy character seem to fail to affect the ear of the Mouse.

The same is noticeable in the hearing of people. To some persons a note one octave higher than the highest note of a piano, cannot be heard. Others can hear such a tone, and yet others are made painfully nervous by it without knowing quite what the trouble is. To some the chirp of the Sparrow is the upper limit of hearing, others can hear the voice of the Bat, yet others are able to hear the notes of insects that range higher in pitch than the voice of the Bat. Dr. Wollaston says, "As there is nothing in the nature of the atmosphere to prevent the existence of vibrations incomparably more frequent than any of which we are conscious, we may imagine that animals like the Grilli (Grasshoppers) whose powers appear to commence nearly where ours terminate, may have the faculty of hearing still sharper sounds which we do not know to exist; and that there may be other insects, hearing nothing in common with us, but endowed with a power of exciting, and a sense which perceives vibrations of the same nature, indeed, as those which constitute our ordinary sounds, but so remote that the animals who perceive them may be

said to possess another sense agreeing with our own solely in the medium by which it is excited."

The human ear is capable of hearing musical sounds produced by vibrations ranging from twenty-four in a second of time to forty thousand. This indicates that humanity is confined in interest to the motions of the atmosphere within these limits. The possibilities of higher and lower fields of music are such that one writer has said that it may be that the air about us is constantly resounding to the music of the heavenly hosts while our dull ears with their limited powers are unable to catch the poorest note in that celestial harmony.

Sound travels about one thousand ninety feet in a second in the air. Through other elastic mediums it varies in speed. The beholder of an explosion of dynamite in a harbor, receives three shocks, one coming by way of the air, another by water, and the third through the earth, all arriving at different times.

It is a fortunate thing that low sounds travel as rapidly as high ones and loud sounds no faster than soft ones. Thus the playing of a band upon the water, at a distance, is beautiful, because all the tones powerful enough to reach the listener do so at the right time to preserve harmony. If it were not for this equality in traveling power, no music on a grand scale could be possible, for those sitting at a distance from the performers would be in a sea of discord from the late arrival of tones which should have blended with those gone before. In spite of the fact that our highest appreciable note is but one-third of an inch in length of wave and the wave of our lowest note exceeds forty feet in length, all sounds produced in harmony travel in harmony till exhausted in space.

The ears of various animals are beautifully adapted to their respective habits. The watch of the Dog is most

valuable because distant noises are so readily detected by his faithful ear. The Thrush has been observed hopping along the ground with frequent stops to listen. So keen is his hearing that the presence of a Worm below the surface is detected by the sound of the Worm's occupation. By judiciously beating the ground he brings the Worm toward the surface as if to escape its enemy, the Mole. At the proper instant the turf is torn up and nearly always the Worm secured.

The form of the outer ear is adapted to the needs of the animal. Most grass eating animals have ears that turn readily in all directions to listen for enemies, but the ears of flesh eating animals that pursue their prey are set only to reach forward to hear the sounds of escaping prey.

Many insects and lower orders of animals are looked upon by man as incapable of the pleasures of hearing. But this is often a mistake. Snails have been known to enjoy the voice of their human friends and come forth when called by familiar voices.

The fondness of the Cobra for music and the powers of charming this hideous animal partly by appealing to his esthetic hearing are well known. Moths have good hearing as one may observe while walking in the woods where the crackling of dry sticks alarms them so they fly up from their noonday slumbers in great numbers. The antennae of the Butterfly are supposed to act as hearing organs. Crabs and Shrimps hear with their inner antennae, Clams with their feet, and some of the crustacea with the bases of the lobe of the tail.

Many animals seem to enjoy the voice of man and the sounds of the various musical instruments which he uses. Frogs and Toads may be taught to know their master's voice. Canaries, Parrots, and Doves enjoy human singing and instrumental music as well. A Woodchuck has been known to

manifest his refinement of soul by coming forth from his hole at the sound of a piano and to sit with the air of a connoisseur criticising the selections with which he was being favored.

Not only is the ability to hear different in different persons, but the thoroughness with which they hear varies largely. Few sounds consist of simple waves of air. As the waves of the sea are noticed to bear smaller waves upon them and these in turn to carry wavelets, so the waves of sound are rarely smooth, simple waves. There are many more waves upon waves in sound production than can be observed on the surface of the sea. A note from the piano not only sounds the note which the key struck represents, but also a great many tones that chord with this tone higher up the scale. These overtones are not so loud as the fundamental tone and cannot readily be detected by the uncultivated ear. But they give character to the tone. The overtones make the note of the violin and the cornet differ. No two voices have the same overtones, and while we are unable to hear these overtones by themselves, yet we are able to distinguish the voices of our friends instantly by means of them.

As voices differ in the overtones they carry, so do ears differ in the number of overtones they are able to receive. Some people enjoy hearing high voices only. For them the soprano or tenor is always in demand. Others prefer deep voices and admire altos and basses. I have stood beside a friend at a concert where a first class artist was pouring forth a baritone song with the most delicate and artistic tone and finish, and had my friend turn to me and say: "What on earth do people find in that man's voice to pay money to hear?" The singer's voice was full of rich overtones which made it valuable to the average cultured listener, but in the ear of my

friend they produced a jarring that was decidedly unpleasant to him, although he was fond of the singing of the untrained voices of the members of the choir where he attended church.

A large part of the business of the voice culture expert is the adjustment of the vocal organs in singing so as to produce the right sets of overtones to give the voice a carrying quality and the richness we enjoy in the finished artist. One notable example of the production of too much of a good thing was instanced in the fate of a soprano who came to America a few years ago with an extensive operatic repertoire and a voice that could not be drowned by a full orchestra as it soared to the greatest heights and displayed a flexibility most remarkable. But she failed to please us. A neighbor of mine said to her friend: "Just wait till you hear Madame Blank begin. She has a voice that will cut you like a knife."

Both the inner and outer ear formations are responsible for the differences in hearing in different people. Cultivation does much for any sense, but for him that has no ear for music cultivation will not construct an ear. It is easy to see what a difference in hearing will be produced by a slight change in the position of the outer ear. While listening to a steady sound, draw the ear forward with one finger, relax it to its normal position, then push it back against the head. The quality of the sound heard and its intensity will be varied in each instance.

So we may be lenient with our friends who do not enjoy the same sort of music with ourselves. And the same music will not always be the very same. A pistol shot upon a mountain top sounds much like a fire cracker in a valley, and the condition of the atmosphere frequently modifies music almost as much as the shape of the room in which it is produced.

THE KINGBIRD OF PARADISE.

Wouldn't you little folks like to see a number of us brilliant, gem-like Birds of Paradise flitting among the trees as do your Robins and Woodpeckers and Jays? To see us spreading our wings in the sun, and preening our ruby and emerald and topaz and amethyst tinted plumes, ribbons, and streamers?

Ah, that would be an astonishing sight, but you will have to journey to an island in the South Pacific Ocean to see that; an island whose shores are bathed by a warm sea, and where the land is covered with the most luxuriant tropical vegetation.

It was about three hundred years ago that the people of Europe first knew that such superb birds existed on this earth. Traders visited one of the Malayan islands in search of cloves and nutmegs, and upon leaving, the natives presented them with a few dried skins of a wonderfully beautiful bird. The natives called them "God's Birds," and in order to propitiate heaven for killing them, cut off the feet of the dead birds and buried them beneath the tree upon which they were found.

The dried bodies of the birds were exported as time went on, and as the people of Europe had never seen one alive, but always

the skin without legs and feet, they came to consider them as heavenly birds, indeed, formed to float in the air as they dwelt in the Garden of Eden, resting occasionally by suspending themselves from the branches of trees by the feathers of their tails, and feeding on air, or the soft dews of heaven. Hence they called us the BIRDS OF PARADISE.

It was not till one hundred years after, when a writer and collector of birds visited the island, and spent years in watching and studying us, that the truth became known. Certainly, the gentleman must have laughed, when, instead of heavenly dew, he saw a BIRD OF PARADISE catch a Grasshopper and holding it firmly by his claws, trim it of wings and legs, then devour it, head first. Fruit and insects of all kinds we eat instead of dew and air.

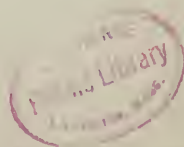
He also saw a party of twenty or thirty males dancing on the branches of huge trees, raising their wings, stretching out their necks and elevating their plumes all for the purpose of admiring themselves or being admired. Some of them have finer plumage than I, but only the KINGBIRDS OF PARADISE have those two dear little rings which you see in my picture.



From col. Mr. F. Kaempfer.

KING BIRD OF PARADISE.
 $\frac{3}{4}$ Life-size.

Copyright by
Nature Study Pub. Co., 1898, Chicago.



THE KINGBIRD OF PARADISE.

THE sublime is no nearer the ridiculous in literature than in the things of nature. An instance of this is the close relation of the common Crow to the most glorious bird of them all. Not only are they very much alike in general form, including shape of feet, bill, bones, and ordinary feathering, but also in habit. They seem to delight in the same sorts of food and secure it in much the same manner. When they are happiest and attempt to pour forth their songs of joy the voice of the Crow is fully as melodious and satisfactory to the human ear as is that of the Bird of Paradise.

The old fable in regard to their having no feet and living only on the dews of heaven and the delicacies which they were supposed to be able to collect from the atmosphere as they floated perpetually free from the earth and its contaminations was so grateful to Europeans that when Antony Pigafetta, who accompanied Magellan around the world and secured a great deal of information at first hand, described them as birds with very ordinary, in fact, almost ugly, feet and legs, he was not believed, and Aldrovandus publicly brought accusations against him for audacious falsehood.

While the males have not only a splendid growth of delicate floating feathers of very unusual length and glossy fineness of texture, the females have but little more to boast of than our American Crow, and they even lack the degree of lustre which our black friend frequently exhibits. But the males are adorned with a wealth of color display, rich in velvety softness and blazing with metallic lustre. This lustre cannot be appreciated from the appearance of the faded specimens so often seen in the museums which may have suffered, not alone from dust and exposure for years to the

chemical action of light but have also been sadly diminished in glory by the rude arts of the natives who fumigate the skins with burning sulphur, their principal care seeming to be to get enough of it deposited to make sure of the skins' not being attacked by insects.

To be seen to best advantage one needs to watch them as they make their short migrations in flocks from one island to another with the change of the seasons from the dry to the wet monsoon. They prefer traveling against the wind rather than with it because their plumage is so elaborate and delicate in its structure that an attempt to fly with the wind frequently brings disaster to the glorious males and causes them to tumble ignominiously to the ground, after which they are a long time in arranging affairs for another attempt at navigation of the air.

The King Bird of Paradise is a small bird, measuring but little over six inches in length. It is extremely vivacious, flying about and running with but little show of the dignity of its family. Very fond of fruits, it is not satisfied with attacking those which other birds of its size would choose, but enjoys showing its gormandizing powers by devouring as much as possible of the largest specimens within its reach.

The fan-shaped tuft of feathers which adorns each side of the bird are subject to his will, being raised and spread out or lowered as the weather or the feelings of the bird seem to demand. At the ends of the long feather shafts springing from its tail are markings which strongly resemble the eye-like ornaments of the Peacock. The shafts seem not content with stretching themselves out to a greater length than that of the bird itself, but at the extremities they curve inward coiling compactly into spiral discs flashing with emerald green.

THE PECCARY.

Looks very much like a little Pig, doesn't he, children? Well, so he is, a species of wild pig found in the canebrakes of Texas, and native of South America.

You would hardly think so small an animal could be so ferocious, but the inhabitants of South America dread and fear him as much as they do the Wild Boar. He is a fearless little creature, too, attacking any object which comes in his way no matter how big it is. Even an Elephant wouldn't scare him, though, as Elephants are not found in South America or Texas, I presume a Peccary never saw one.

His jaws, as you see, are armed with tusks, like those of the Boar, but they are straight instead of curved, are sharp at the edges, and although no longer than your finger can inflict a terrible wound on account of the great strength of the animal's neck.

When a body of them charge an enemy they will fight till every one of them is slain. You will not wonder then that Men, Horses, and Dogs fly at the approach of a herd of Peccaries, the poor Horses being so easily brought down by having their legs cut to pieces by the sharp tusks.

In the canebrakes of Texas, where the trees are of enormous size, the Peccaries make their home. A fallen tree overgrown with thickets of the cane, matted together with strong and thorny vines, is their favorite lodging. Into one of these hollow logs a drove of twenty or thirty will enter at night, each one backing in, the last one to enter standing with his nose to the entrance and acting as sentinel.

On dark, drizzly days they never leave their lodgings, and it is on these days that the farmers who have suffered by their ravages on grain-crop and stock, succeed in putting an end to many of their enemies. As soon as daylight appears and the protruding snout and watchful eyes of the sentinel on duty can be seen, a sharp report of a rifle is heard; with a spring the sentinel leaps out and soon rolls lifeless upon the ground. Instantly a low grunt is heard, and another snout and sharp pair of eyes appear in the opening. A flash, a report, and out he leaps to his death, also; thus they go on till every "lodger" is disposed of.

Of all animals the Peccary alone, it is said, resists the terror of the gun, its flash and report serving only to enrage him.



THE PECCARY.

THIS interesting animal, which is of common occurrence throughout the forests of South America, roams through the woods in large herds and is constantly migrating, being often driven by scarcity of food to make long journeys. Rendgger, the well known naturalist, states that one may follow the Peccaries for days without seeing them. In their wanderings they keep to the open country, which ordinarily they rarely frequent, and even streams cannot stop them. If they reach a field they cross it at a run, and if they arrive at the banks of a river they do not hesitate but swim at once across it.

They have been seen crossing the Paraguay river at a place where it requires about a half hour to do so. The herd keeps together in a close throng, the males in advance, each mother having her young behind her. The noise made by the animals can be heard a long distance, not only on account of the dull, hoarse sounds which they make, but still more by reason of the cracking of the dead branches which they break in their impetuous progress.

Both day and night the Peccaries search for food. They eat all kinds of arboreal fruit and roots, and their teeth are so strong that they can easily open the hardest of palm seeds. They often do great mischief to the crops. Besides vegetable food they are said also to eat Snakes, Lizards, Worms, and Grubs, in this respect being useful animals. They are much more cleanly in their habits than the Wild Boars, and Beehm asserts that they never eat more than they require, and seek water only during periods of the most intense heat, and then they wallow only

in pools. During the day they hide in tree trunks, in which they sleep also at night.

The female gives birth to a single young one, in rare instances to two. The cry of the young is like that of Goats. They are easily tamed and domesticated if treated well. The flesh is eaten by the poorer classes, the skin being chiefly used for bags and thongs. On account of a gland which the animal bears in its haunches and which has an evil effect on the meat, causing it to become unfit for use in a very short time, the flesh is not considered to be particularly excellent.

It has been said that the Peccary is totally devoid of fear. It is small, rarely exceeding eighteen inches in height, and yet it is not less dreaded than the most savage Wild Boar would be. Many an unlucky sportsman, to escape a herd of these wild creatures has been glad to climb a tree in time to save his life. Men, Horses, and Dogs fly in haste, for the Peccaries fight like a well drilled army, and by swarming about an enemy they are sure to conquer with their strong, sharp tusks. They avoid conflict with man, and shyly run into the thick woods on his approach, but when fired upon or brought to bay they seem possessed only with rage and desire for vengeance.

The Peccary is peculiar in his anatomy, having several sacs in place of a single stomach, thus resembling the cud chewing animals. This resemblance is traced still further in the feet, where the metacarpal and metatarsal bones of the two greater toes are united into a sort of cannon bone.

This specimen came from the cane-brakes of Texas.

AUTUMN.

"Lightly He blows, and at His breath they fall,
The perishing kindreds of the leaves; they drift,
Spent flames of scarlet, gold aerial,
Across the hollow year, noiseless and swift.
Lightly He blows, and countless as the falling
Of snow by night upon a solemn sea,
The ages circle down beyond recalling,
To strew the hollows of Eternity.
He sees them drifting through the spaces dim,
And leaves and ages are as one to Him."

THE summer wanes; the days grow shorter and the evenings longer, heralding the advent of Autumn, and the woods and fields are mellowing under the genial glow of the sun. All Nature is taking on a warmer tinge, gladdening the eye with its fullness of beauty—rich in the promise of autumnal harvest.

It is a sad fact, but none the less true that a great many of us go through life with unseeing eyes. Why must we be *taught* to see the beauties around us? What a tale might be told by the little flower that we pass carelessly by, or tread upon in our haste; if we would but listen!

* * * * *

Overhead in the maple a little life was struggling for being. It was only a pebble thrown by a thoughtless boy "to see if he could hit it," but the cruel act was done, and the little songster, the happy bird whose early morning matins together with the carolings of his mate, had greeted us all through the summer lay in the little nest grievously wounded. The hurried, distressed movements of his little mate told of her anxiety to do what she could for the sufferer. She seemed to know it would not be long, now,—that he would never sing with her again.

After awhile everything was still in the maple bough. It was growing dark as we softly approached the nest, and we thought the remaining bird

There is beauty everywhere—in the early dawning when the iris-tinted morning-glories are radiant with glittering dew drops; when the sun is high overhead; when the soft twilight has enveloped the land in its mantle of calm; whether the rain is falling or whether the skies are blue and sunny beauty is everywhere.

"How strikingly the course of Nature tells by its light heed of human suffering that it was fashioned for a happier world!" Listen to the songs of happy birds. How care-free! How joyously they outpour from overflowing little throats their God-given melodies of love and gladness! Is not the world brighter and better for their being?

had flown away. It had not, however, for as the inquisitive face of our little girl peeped into the leafy retreat we heard a rustle of wings, and the bird flew out from its place of repose. Perhaps she was watching the little dead form of her mate, sure that her vigil would be rewarded and that he would greet her in the morning with love as he had done for so long. Who knows?

Next day we buried the little martyr and the other bird went away. She has not returned since, but the nest still remains in the old place. The boy who had done the mischief went on his way unconscious of the thing he had done, but

"He can never, never repay
The little life that he took away."
—E. S.



THE BOTTLE-NOSE DOLPHIN.

DOLPHINS, according to the best authorities, inhabit all oceans, and undertake great migrations, but are the only Whales which frequent the rivers or even spend their whole lives in them, or in the lakes connected with them. They are all gregarious, some of them collecting in very large shoals, and roaming about the sea together for weeks and weeks. Their liveliness, playfulness, and lack of shyness have earned them the friendship of sailors and poets from the remotest ages.

The Bottle-nose Dolphin is one of the best known members of the family. The snout is very long, like a beak, and protrudes from twelve to twenty-four inches. The range of this Dolphin seems to be restricted to the Arctic Ocean and the north of the Atlantic, but it is known to make regular migrations a considerable distance south of it. Occasionally it appears on the coast of Great Britain. Cuttlefish, Mollusks, and small fry compose its food.

Kuekenthal declares that its diving

powers are remarkable; 300 fathoms of line were taken off by a harpooned Bottle-nose which remained forty-five minutes under water. They swim with such extraordinary speed that they not only follow the course of the swiftest steamer with ease, but gambol near it on their way, circling around it at will, and without being left behind. Occasionally one of them jerks himself up into the air, and, turning a somersault, falls noiselessly back into the water and hurriedly resumes his former position.

Several years ago we saw a school of Dolphins swimming and frolicking in the East River on the way from New York Bay to Long Island Sound. They seemed to us like gigantic Swine, their motions being similar to those that precipitated themselves, according to the New Testament, into the sea. They are very interesting to watch, and travelers find great pleasure in their company in crossing the ocean. Sometimes a small school of Dolphins will play about the ship for days at a time, affording constant amusement to the spectators.

NEW CHAMPION FOR THE SPARROW.

THE Sparrow has found an unexpected champion in the Prime Minister of France. The farmers have recently been agitating in favor of the extermination of the little bird, and succeeded so far that a decree was submitted to Premier Meline for signature, giving orders for the destruction of the bird throughout the country by all available means. Before giving his sanction to the measure the Prime Minister determined to make an investigation, in the course of which he has received so much information in favor of the birds, especially from the Forestry Department, that he has not only

refused to sign the decree, but has announced that he is about to take steps to promote the increase of the species in consequence of its usefulness. It seems that the harm they do to the crops is more than counter-balanced by the benefits which they confer in destroying the Caterpillars, Worms, and other insects that are so detrimental to trees.

It seems incredible that the matter of the usefulness or noxiousness of this little bird cannot be settled finally by those vested with authority to act. It is either beneficial or a pest. We think it is both, according to circumstances.



THE TUFTED PUFFIN.

THESE birds nest in colonies, the family consisting of about thirty species, nearly all found in the northern parts of the northern hemisphere. Audubon is said to have procured the specimen figured by him at the mouth of the Kennebec river, Maine, the only record of its occurrence on the Atlantic coast.

The Tufted Puffin breeds upon the rocks and in the Rabbit warrens near the sea, finding the ready-made burrows of the Rabbit very convenient for the reception of its egg, and fighting with the owner for the possession of its burrow. Where Rabbits do not exist, the Puffin digs its own burrows, and works hard at its labor. The egg is generally placed several feet within the holes, and the parent defends it vigorously.

Like most of the sea birds, both sexes assist in incubation, says a recent writer, referring to the birds found at the famous rookery in the open sea two hundred miles west of Fort Wrangell, an island often visited by the Indians for birds and eggs, and are close sitters, a great amount of probing with a long stick being necessary to dislodge them. A grassy hill side is a favorite retreat and here it is dangerous to travel about on account of the Puffins constantly coming blindly out of their dark holes with a force sufficient to upset one if fairly struck by the flying birds. When specimens are wanted they are easily captured with snares set over their holes during the night. The vari-colored pear-shaped eggs are well known and make good eating.

The Farrallones are the home of vast numbers of Puffins, as well as

other sea-birds, though less numerous than formerly. The nests have been robbed for the eggs to an extent that threatened their extermination until a recent law was enacted for their protection. A portion of the island is a veritable rookery, the grotesque birds standing guard all about the rocks. They are very awkward on land, moving with a comical waddling stride, but on the wing are graceful, rapid flyers. They dive and swim with ease, pursuing the fish in the water, which, with crustaceans and insects, constitutes their food.

The Farrallones have become largely known from the wholesale collection of the eggs of sea birds for market purposes. As they nest chiefly in colonies, the eggs therefore being numerous, it has been, hitherto, a considerable industry. The eggers starting together soon separate to cover their various routes over the cliffs, the birds appearing in rows all over the hill side. "As an egger climbs his familiar trail toward the birds, a commotion becomes apparent among them. They jostle their neighbors about the uneven rocks and now and then with open bills utter a vain protest and crowd as far as possible from the intruder without deserting their eggs. But they do not stay his progress and soon a pair, then a group, and finally, as the fright spreads, the whole vast rookery take wing toward the ocean. Instantly the Western Gulls congregate with their hollow *kock-kock-ka* and shrill cries adding to the din, to secure their share of the booty, and the egger must then work rapidly to secure the eggs."

"THE TALK OF ANIMALS."

[This is the title of an article from the *London Telegraph*, which is so well written, and is so interesting that we cannot deny ourselves the privilege of making liberal extracts from it..]—*Ed.*

NATURALISTS have recently been discussing the interesting question whether or not Bees can talk with each other. Those best informed on the subject are, we gather, inclined to regard it as perfectly possible. Such a view would, perhaps, astonish many minds not familiar with these and others of the lower creatures by daily observation. Yet the more people live in close notice of animals and insects the less inclined they will feel to draw that very difficult line which divides instinct from reason, or to set any hard and fast limit to the wonders of Nature. In fact, the very word "lower" becomes sometimes an insult, a positive affront to the wonderful life about us, which even proud Man himself has scarcely a right to offer. There could, for instance, be nothing well conceived humbler than the Earthworm. Until the illustrious Darwin took up the subject of that despised being no one comprehended the vastness of man's debt to this poor, ugly, trampled creature. The numberless millions of that obscure tribe, none the less, have created all the loam and all the arable land of the whole globe, passing through their bodies the fallen leaves and decaying vegetable matter; and by their single sphere of labor in this respect rendering cultivation and harvests possible. When we tread on that Worm we destroy an agricultural laborer of the most respectable class. To those eternal and widespread toils of the creeping friend of men we owe the woods, the meadows, and the flowers. This is, of course, only an example of the importance, not of the faculties of the lower creatures.

Nevertheless even Worms communicate sufficiently to have and to observe

their seasons of love; and Bees are so much higher in the scale of life, and so richly gifted in all details of their work, and so sociable in their habits, that it would not be at all a safe thing to say they possess no means of intercourse. Certainly no skillful and watchful bee-master would ever venture upon such an assertion. He knows very well how the sounds in the hive and those produced by individual Bees vary from time to time, and in a manner which appears to convey, occasionally at all events, mutual information. A Wasp or a strange Bee entering a hive without permission seems mighty quickly to hear something not very much to its advantage, and when two or three Bees have found a good source of honey, how on earth do all the others know which path to take through the trackless air, except by some friendly buzz or wing-hint? Now, the bee-masters tell us that there is surely one particular moment in the history of the hive when something very much like actual language appears to be obviously employed. It is when the young queen is nearly ready to move away. She begins to utter a series of faint, staccato, piping noises, quite different from her ordinary note, and just before she flies off this sound becomes altered to a low, delicate kind of whistle, as if emanating from some tiny fairy flute. How this small cry, or call, or signal, is produced nobody understands. The major portion of sounds in a hive is, of course, caused by the vibration more or less rapidly of the wings of the Bees. But whoever has examined the delicate machinery with which the Grass-hopper makes his chirp would not be surprised to find that the queen Bee had also some peculiar contrivance by which to

deliver what may be called the royal speech on the one or two great and signal occasions of her exemplary life.

We should, however, confine the subject in the boundary of far too close a fancy if it were imagined that sound was the only way in which speech and intercourse may pass among these humble creatures. Human beings naturally gather up that idea by living themselves in an atmosphere of which they agitate the waves for objects of mutual communication. No scientific Bee or highly educated Ant, if such creatures were possible, seeing and hearing men and women talk to each other, would dream that they could equally well exchange thoughts by making marks upon paper, or send their messages of love and business by seas and lands through a quivering wire. Nay, if report is to be believed, we are soon to be able to transmit, at a flash over long distances, a face, a map, a plan, a picture, a whole page of a newspaper, or an actual scene. As, therefore, those lower creatures, if they indeed could hear us speak, would have no notion of how we make the air waves into words, and still less grasp knowledge of any subtler form among human intercourse, so it is not quite safe for man to think and call all these strange families of the silent world alike dumb, or to despise them for being free of grammars and dictionaries. As a matter of fact, it is obvious that some power of mutual communication assuredly comes to all creatures that live in societies. Nobody can watch the flight of a flock of birds, the behavior of a herd of cattle, or, lower down, the marvelous accommodations for common existence of the small creeping and flying things, without perceiving that they know each other's minds in some way or other in a very satisfactory manner. Evidently there is, to begin with, a common language—a *lingua franca*—of the fields and of the forests. All sportsmen know how the particular

cry of a frightened bird will put all the wild animals on the alert who would otherwise quite disregard the bird's ordinary note. And the evil success with which poachers can imitate the cries of love and defiance from denizens of the woodlands, proves that its inhabitants possess a vocabulary which can be stolen.

But, who, in truth, loving Dogs and Cats and such-like humble friends ever can doubt their high intelligence and the strong and clear significance attaching to certain among their habitual utterances? Even London cab and cart Horses, though they cannot—fortunately for some among us—speak, grow to understand the few invariable words of direction which their drivers address to them. In the inferior orders of life there are doubtless many other methods of intercourse, and almost certainly there exists a plain and very useful language of touch. Nobody can read the delightful researches of Sir John Lubbock into the habits and customs of Ants without feeling persuaded that those little beings transact their business perfectly well by touching each other's antennæ. When Ants meet, a rapid passage of these wonderful organs takes place, gliding like rapiers above and below, and this quickly informs them whether they be friends or enemies, which is the nearest respective road home, whether any food is to be procured nigh at hand, and what is the general news in the formicatory world. Truly it would be more desirable to learn what Bees talk about rather than to discuss the problem whether they talk at all. The views of Bees upon the purposes and colors of flowers, upon the moral duties of frugality and loyalty, and as to the real meaning and loveliness of a Rose, would be worth hearing. Of this much we may be all assured, that the little things of the world evade our knowledge as much and are quite as marvelous as the very largest and highest.

THE BUTTERFLY.

BY EMILY C. THOMPSON.

IN THE western part of England if the first Butterfly you see in the spring is white and if you succeed in killing this Butterfly, good luck will surely come to you. Some gentlemen on their way to church one day saw a friend dashing down the road wildly brandishing a cane. He could not stop to explain. He was as a rule a sedate, calm man, so this excitement alarmed them. As nothing could be done, they went on their way and soon met the father of their friend, an old man who usually hobbled painfully along on two canes. He too was excited and was doing his best to make his way down the road with only one cane. His first words were, "I'm afraid he has missed it." "Missed what?" thought the gentlemen, and finally after many efforts to quiet him enough for conversation learned from the old man that his son had seen his first butterfly, that it was white and that without more ado he had snatched his old father's cane and set off in pursuit. Still the old man was perfectly willing to hobble along as best he could, if only good luck and prosperity could be procured by the slaughter of the pretty little insect. The color of its wings is due to what seems to us a fine dust scattered over them, but in reality this dust is made up of little discs fastened by stalks to the wings, arranged usually in rows somewhat like the shingles on a house.

Notice its two great round eyes and remember that each of these is composed of thousands of perfect little eyes. Its trunk you will find coiled up under its head and sometimes this Butterfly of ours completes its toilet by opening its trunk and cleaning it. By the antennæ of the Butterfly you can tell it from the Moth, for those of

the former are immovable and furnished with knobs, while those of the other have not the knobs and can be stowed away under the wings. If you wish to distinguish the Butterfly from the Moth, remember this fact, and also that Butterflies fly only in the daytime and always rest with the wings erect. These facts are trustworthy, for no Moth has ever been found to possess all three of these characteristics, though some do possess one or two.

Though curious in itself, its life history is still more curious. Man, in passing through his seven ages never loses the distinguishing characteristics which make him a man, but our Butterfly as it passes through its three ages changes so much that we seem, while studying it to be studying three distinct creatures—the Caterpillar, the Chrysalis, and the Butterfly.

In the Caterpillar our dainty little fairy presents itself as it appears in its first stage, having just spent a few days, or a month, or perhaps the whole winter in the egg. It changes its old skin many times during its Caterpillar life of twenty or thirty days, at each change gaining in weight and brilliancy, until with the last it appears as a Chrysalis "a legless, mummy-like creature," which maintains its suspended position by means of the hooks on its tail or by a silken girth around its body. A few days before the Butterfly comes forth, it can be seen through the thin cases. Finally the skin on the back bursts open and the little insect is free. For a few minutes it stands with drooping wings. Gradually the wings distend and in a short while reach four times their original size. Then our Butterfly hastens away to carry its joyful greeting to man and flower. So the cycle of Butterfly life can thus be

indicated: Egg, Caterpillar, Chrysalis, Butterfly, Egg.

Why they migrate is not known but evidence enough has been brought in by eye witnesses to prove that this does occur. One flight seen in Switzerland lasted for two hours, the continuous stream of insects being ten or fifteen feet wide and made up of the species called the Painted Lady. Similar companies have been seen at sea, as Mr. Darwin bears witness, also before and after tornadoes in certain places. In Ceylon a gentlemen drove through a cloud of white Butterflies for nine miles. But very interesting to us, is a great migration recorded to have been seen in our own country, in Massachusetts, about Oct. 1, 1876. These are strange stories, but really hardly more strange than other facts about these little animals, graceful and beautiful in form and motion, whose very presence adds greatly to the charm of mother Nature.

Such quantities of eggs are laid by the Butterflies that if certain animals did not contend against them, man would not be able to withstand the ravages of the Caterpillar. Man has one powerful ally in the birds which devour enormous quantities of these eggs, but a still more powerful ally is the Ichneumon Fly. This little insect is a parasite through its grub state and chooses as its host either the egg of the Butterfly or the Caterpillar. The full grown Fly lays its egg by means of an ovipositor, a sharp, hollow instrument with which it can pierce the skin or shell of its victim. The eggs of the fly hatch and the grubs feed upon the Caterpillar, but usually do not touch upon its vital parts until it is full grown, then they devour them and within the skin of their former host form their own cocoons. Sometimes they wait until the Caterpillar assumes its Chrysalis state before they finish their dread work, then much to the surprise of

interested beholders, a little cluster of flies appears at the breaking of the cocoon, and no beautiful Butterfly.

Some of these brightly colored little messengers of gladness live through the winter. Usually they pass this trying period wrapped warmly in the cocoon or nestled under some leaf, still a Chrysalis; but a few species weather the cold and the snow and, shut up in some hollow tree or some empty shed, sleep away the happy days of Jack Frost and Santa Claus and are ready to awake with the spring, when they are not abashed in their bedraggled garments to appear among their brothers, who come forth brightly clad, fresh from the soft, warm resting place of the cocoon.

Perhaps the marvelous migration of Butterflies which occurred on Oct. 3, 1898, will be more interesting to us than those already mentioned because it happened so recently and in our own country, and perhaps, most of all, because the reason for flight is hazarded. The inhabitants of Wichita, Kansas, at 3:15 o'clock in the afternoon of that day were greeted with the sight of many Butterflies flying south. Gradually the number increased until business practically ceased, the inhabitants all turning out to view the brilliant spectacle. The stream of yellow and brown insects, with the accompanying purr and brilliant effects of fluttering wings flowed on until within a half an hour of sunset, and even after this, millions of stragglers hastened southward. But you are interested in the reason given? They say that our little friends were driven away from their customary haunts by the forest fires in Colorado. This is only one more supposition to add to the list already awaiting some enterprising student, who shall at last solve the mystery of these wonderful flights and fully acquaint us with all the other interesting facts which our little Butterflies are still keeping secret.

THE ARMADILLO.

ALL Armadillos bear the name Fatu in the South American Guarani Indian language. Although the name is of Spanish origin the Indian term Fatu has also been adopted in European languages, except in the single case of the six-banded species. They are all of more or less similar appearance and habits. They are natives of the southern American belt, extending as far north as Mexico, and the specimen presented here was taken in Texas, where it is occasionally found. The Armadillos are at home in sparsely grown and sandy plains, and in fields on the edges of woods, which, however, they never enter. During the breeding season they consort together, but at all other times lead solitary lives and show no regard for any living thing except as it may serve for food.

Singular as it may appear, Armadillos do not have a regular abiding place, and they frequently change their homes. They can dig a hole in the ground five or six feet deep with such expedition that they are able to have several places of retreat. The hole is circular, at the entrance from eight to twenty-four inches wide, and at the bottom is a snug chamber large enough for them to turn around in. They are great night rovers and seldom move about by daylight, the glaring sunlight dazing them. When seen during the day it is always in rainy weather when the sky is overcast. It has been shown that Armadillos excavate their burrows under the hills of Ants or Termites, where they are able to gather their principal food with the greatest convenience by day as well as by night. Besides the foregoing they eat Caterpillars, Lizards, and Earthworms and are thus advantageous to the husbandman. Plants also consti-

tute a part of their diet.

Armadillos are not agile but are remarkably muscular. It is said, to avoid their enemies they can cut their way into the earth in places which a hoe wielded by a strong man can pierce with difficulty. The Fatu needs only three minutes to drive a tunnel exceeding the length of its own body. The strongest man is incapable of pulling it out by the tail. Once in its hole, it is always secure from Dogs. When it is seized by Dogs, it never defends itself in any way. This is probably not from cowardice, but because it believes itself secure from danger.

Best of all, the Armadillo is a useful animal. The Indians are fond of nearly all the species. While it has an unpleasant odor of musk, it can be prepared for the table; and some think it one of the most palatable of dishes. One of the species can roll itself into a ball, which, however, it does only in extremity.

In captivity Armadillos are usually put in cages with Monkeys, who, if they do not precisely reduce them to servitude, at least use them as playthings. The Monkeys ride their backs sportively, turn them over, without the danger they might experience from Turtles, who are less harmless, and cause them no end of worry. The Armadillo, with all his coat of mail, has a fur lining on his belly, and the experienced Dog quickly turns it over and makes short work of the apparently invulnerable quadruped. The Dog quickly crunches the thin armour and leaves the poor beast lifeless. Only the powerful digging claws which might, one would think, be used in his own defense, remain to tell the tale of the only means which nature has seemed to provide him with against his enemies.



NATURE'S GROTESQUE.

(THE YELLOW-BREASTED CHAT.)

THIS bird comedian is an actor, a mimic, and a ventriloquist; he has been called "a rollicking polygot," "an eccentric acrobat," "a happy-go-lucky clown, turning aerial somersaults," "a Punchinello among birds," and from my own experience I can add that he is a practical joker and "an artful dodger." His voice is absolutely unique in its range. Besides his power as a ventriloquist, to throw it in any direction, and so entice away from his nest any intruder upon his domain, he possesses the most unequalled capacity for making queer noises. On a certain summer day I was driving to Monticello, the Virginia home of President Jefferson, along a beautiful road, bordered by tall trees and a thick, leafy undergrowth where a thousand nests might be safely hidden. All along a road the Chats called *chit, chit*, or barked, whined, clucked, whistled, sang, chuckled and called overhead, or out of the bushes beside us, always invisible, or just giving a flutter to the leaves to show their presence. One of the party declared one called *Kitty, Kitty!* distinctly, and he also mimicked a puppy most successfully. Later on, in July, I was stopping near a favorite haunt of the Chats; a country place on the edge of the woods, where thickly growing shrubs and bushes filled the deep hollows between the hills and near the streams. Here they had their broods, and not only all day, but late in the evening by moonlight they could be heard, making the whole place ring with their medley of sounds, while not a feather of them could be seen.

Yet I finally succeeded in catching various glimpses of them, and in equally characteristic, though different

moods. First, I saw them darting rapidly to and fro on foraging journeys, their bills filled with food, for they are most admirable husbands and fathers, and faithful to the nests that they hide with such care. They are beautiful birds, rich olive-green above and a bright yellow below, with two or three pure white lines or stripes about the eye and throat and a "beauty spot" of black near the beak. I watched one balancing on a slender twig near the water in the bright sunshine and his colors, green and gold, fairly glittered. His nest is usually near the ground in the crotch of a low branch and is a rather large one, woven of bark in strips, coarse grass and leaves, and lined with finer grass for the three or four white eggs, adorned with small reddish-brown spots. One pair had their home near a blackberry thicket, and they might be seen gobbling berries and peeping at you with bright black eyes all the while.

The Chat excels in extraordinary and absurd pose; wings fluttering, tail down, legs dangling like a Stork, he executes all kinds of tumbles in the air. It is said that a Chat courtship is a sight never to be forgotten by the lucky spectator. Such somersaults, such songs, such queer jerks and starts. Our bird is one of the Wood Warbler family, a quiet and little known group of birds. His elusiveness and skill in hiding, and his swift movements, are his only traits in common with them.

ELLA F. MOSBY.

In those vernal seasons of the year, when the air is calm and pleasant, it were an injury and sullenness against Nature not to go out and see her riches and partake in her rejoicing with heaven and earth.—MILTON.

THE RED-HEAD DUCK.

IN MANY points of structure and habits Sea Ducks, of which this is a specimen, may be distinguished from Fresh Water Ducks by the presence of a lobe or little flap of skin on the lower side of the hind toe. The legs of the former are also placed farther behind, and they are thus better fitted for swimming, though not so well adapted for walking or running on land. The feathers of Sea Ducks are more dense also, and they are all provided with a quantity of thick down next to the skin, which is of no small commercial value.

The difference in the habits of the two species is no less striking. The latter dive for their food, which the former never do; they are chiefly maritime in their distribution, although all, or nearly all, retire to fresh water lakes to raise their young.

The Red-head is said not to be common along the coast of New England, but in the winter months is found in considerable numbers along the south shore of Long Island. It is extremely abundant south of that point, and particularly so in Chesapeake Bay, where immense numbers are killed each season. Where it is enabled to feed on the well known wild celery its flesh is said to be fully equal in flavor to that of the Canvas Back. Both in spring and fall it is an extremely abundant migrant in the Western States. It generally reaches northern Illinois, says Hallock, in its spring passage about the last of March, remaining until the latter part of April. On its return journey late in October,

it remains on the rivers, lakes, and sloughs until the cold weather, by freezing up its feeding grounds, forces it to go farther south. It is altogether probable that a few of these birds breed in the Rocky Mountain regions within the limits of the United States, but they usually continue northward to their regular breeding grounds, which extend from Wisconsin, Michigan, and others of the northern tier of states, to the fur countries.

The Red-head was found nesting on the St. Clair Flats, Michigan, by Mr. W. H. Collins, who, in describing some of its breeding habits, says: "I had the good fortune to find two nests of this bird containing respectively seven and eight eggs. The first was placed on some drifted rushes on a sunken log, and was composed of flags and rushes evidently taken from the pile of drift upon the log, as they were short pieces, so short, in fact, that the nest when lifted with the hands fell in pieces. The nest was four inches deep and lined with down from the female. This nest contained seven fresh eggs of a creamy color, varied in measurements and of a uniform oval shape, very little smaller at one end. The other nest was built similar to a Coot's nest; that is, of flags and grass interwoven at the base of a bunch of flags growing in water three or four feet deep. It was built in such a way that the nest would rise and fall with the water."

The food of the Red-head consists of mollusks, shell-fish, and the seeds and roots of aquatic plants.

BIRDS IN GARDEN AND ORCHARD.

DURING the last year I have received quite a number of letters from all over the United States, inquiring why so few birds are found about the homes, among the ornamental shrubs and trees, and in the orchard. My correspondents also wish to know how our beautiful native songsters can be induced to take up their residence in the neighborhood of man. As the many inquiries came from the East, the West, the North, and the South, I shall treat the subject in the following manner :

The northern, eastern, and central states show but little difference as to their bird-life, and there is also little diversity in regard to the ornamental trees and shrubs of the gardens. The region included is bounded on the north by the British possessions, on the east by the Atlantic ocean, on the west by the Rocky mountains, and on the south by the Indian Territory, Arkansas, Tennessee, and North Carolina. While living in the country I have always had birds at my home and in the neighborhood, and I shall, therefore, give my own experience.

Birds settle only where they find the surroundings perfectly congenial, and where they are protected and consequently feel safe ; where dense shrubbery, evergreens, and deciduous trees abound, and where water and suitable nesting material are near at hand. In one garden they are exceedingly numerous, while in another one close by, only a few pairs, perhaps, are to be found. When protected, they soon learn to regard man as their friend. Their enemies, especially Cats, Squirrels, and Owls, must not be allowed to rove about in the garden and orchard, and such thieves and robbers as the Blue

Jay, the Loggerhead Shrike or Butcher Bird, and that abominable tramp and anarchist among birds, the English Sparrow, should never be tolerated in a garden or park where other birds are expected to make their homes.

In the days of my boyhood the groves re-echoed with the songs of many birds ; the woods, however, have been cleared away, and in the poor remnants of the once magnificent forests there are few birds to be found today. The sweet notes of the Veery, the thundering sounds of the Ruffed Grouse, the loud hammering of the Pileated Woodpecker, are no longer heard. I have devoted much time to erecting bird houses and planting ornamental trees and shrubs for the accommodation of the birds. Here they soon took up their residences. On the top of the barn and granary Martin boxes were placed, and in the gables of the barn holes were cut to admit the pretty Barn Swallow and the Phoebe. Among the first birds to settle were the Robins and Bluebirds, both heralds of spring, appearing in the last days of March or early in April from their winter homes in our Southern States. The Baltimore Oriole suspended its beautiful hanging nest from a high horizontal branch of a Walnut tree. The Cedar Bird, quiet and retired in its habits, and a most beautiful denizen of the garden, placed its nest constructed of sheep's wool on a low horizontal branch of an Oak. The sprightly Canary-like song of the American Goldfinch, often called the Wild Canary, was heard throughout the summer, and its cozy little nest, lined warmly with thistle-down, was placed in the upright exterior branches of a Sugar Maple. In the same tree, but lower down on a horizontal branch the exquisite pendulous nest of the

Red-eyed Vireo was now and then found. This Vireo is an incessant songster as it gleams among the upper branches of the trees.

The Rose-breasted Grosbeak invariably nested in a clump of dense wild Crab-apple trees, partly overgrown with grape vines. Another inhabitant of the grove not easily overlooked, is the bold Kingbird, the guardian of the barnyard, its nest saddled on a rather strong moss-covered limb of another Oak. I could mention a number of other birds that build their nests near

the dwellings of man, but space will not permit me to do so. I will add, however, that if my readers would have about them these beautiful and useful birds, which are almost the best friends of mankind, don't allow English Sparrows to come near your home, and you will soon find yourself in the midst of the songsters. The incredible numbers of English Sparrows now found almost everywhere have driven our native birds away.

—JOS. F. HONECKER,
Oak Forest, Ind.

GOLDENROD.

PRING is the morning of the year,
And Summer is the noontide bright;
The Autumn is the evening clear
That comes before the Winter's night.

And in the evening, everywhere
Along the roadside, up and down,
I see the golden torches flare
Like lighted street-lamps in the town.

I think the Butterfly and Bee,
From distant meadows coming back,
Are quite contented when they see
These lamps along the homeward track.

But those who stay too late get lost;
For when the darkness falls about,
Down every lighted street the frost
Will go and put the torches out!

—*Frank Dempster Sherman.*

Public Library,
LANSING, MICH.



From Nature by Chicago Colortype Co

OCTOBER.

AY, thou art welcome, heaven's delicious breath,
When woods begin to wear the crimson leaf,
And suns grow meek, and the meek suns grow brief,
And the year smiles as it draws near its death.
Wind of the sunny south! oh still delay,
In the gay woods and in the golden air,
Like to a good old age released from care,
Journeying, in long serenity, away.
In such a bright, late quiet, would that I
Might wear out life like thee, mid bowers and brooks,
And, dearest yet, the sunshine of kind looks,
And music of kind voices ever nigh;
And when my last sand twinkled in the glass,
Pass silently from men, as thou dost pass.

—BEZANT.

October days are stealing
All swiftly on their way;
The squirrels now are working,
The leaves are out at play;
The busy, busy children
Are gathering nuts so brown,
And birds are gaily planning
A winter out of town.

—CLARA L. STRONG.

FROM "CONSTANTINOPLE."

EDMONDO DE AMICIS.

CONSTANTINOPLE has one grace and gayety peculiar to itself, that comes from an infinite number of birds of every kind, for which the Turks nourish a warm sentiment and regard. Mosques, groves, old walls, gardens, palaces all resound with song, the whistling and twittering of birds; everywhere wings are fluttering and life and harmony abound. The sparrows enter the houses boldly, and eat out of women's and children's hands, Swallows nest over the café doors, and under the arches of the bazaars; Pigeons in innumerable swarms, maintained by legacies from sultans and private individuals, form garlands of black and white along the cornices of the cupolas and around the terraces of the minarets; Sea-gulls dart and play over the water; thousands of Turtle-doves coo amorously among the

cypresses in the cemeteries; Crows croak about the Castle of the Seven Towers; Halcyons come and go in long files between the Black Sea and the Sea of Marmora; and Storks sit upon the cupolas of the mausoleums. For the Turk, each one of these birds has a gentle meaning, or a benignant virtue: Turtle-doves are favorable to lovers, Swallows keep away fire from the roofs where they build their nests, Storks make yearly pilgrimage to Mecca, Halcyons carry the souls of the faithful to Paradise. Thus he protects and feeds them, through a sentiment of gratitude and piety; and they enliven the house, the sea, and the sepulchre. Every quarter of Stamboul is full of the noise of them, bringing to the city a sense of the pleasures of country life, and continually relishing the soul with a reminder of nature.

There are several kinds of animals, points out Cosmos, that have never swallowed water. Among these are the Lamas of Patagonia and certain Gazelles of the far east, and a considerable number of reptiles—Serpents, Lizards, and certain Batrachians—that live and flourish where there is no moisture. A kind of Mouse of the arid plains of western America also exists where moisture is said to be unknown.

In the London Zoological Gardens a Paroquet lived fifty-two years without drinking a drop, and some naturalists believe that Hares take no liquid except the dew that sometimes forms on the grass they eat. Even Cows and Goats in France, in the neighborhood of the Lozere, almost never drink, yet they produce the milk from which is made the famous Roquefort cheese.

ANIMALS AND MUSIC.



NE of our poets is authority for the statement that "music hath power to sooth the savage breast," but experiments have recently been made in Lincoln Park, Chicago, *The American Naturalist* tells us, to determine with scientific accuracy the effects of violin playing on certain animals.

"Music which was slow and sweet, like 'Home, Sweet Home' or 'Annie Laurie,' pleased the Panthers, a Jaguar, and a Lioness with her cubs. The Panthers became nervous and twitched their tails when a lively jig, 'The Irish Washerwoman,' was played to them, and relapsed into their former quiet when the music again became soothing.

"The Jaguar was so nervous during the jig music that he jumped from a shelf to the floor of his cage and back again. When the player ceased playing and walked away, the Jaguar reached out his paw to him as far as he could. His claws were drawn back.

"The Lioness and her cubs were interested from the first, though when the violinist approached the cage the mother gave a hiss, and the cubs hid behind her. At the playing of a lively jig, the cubs stood up on their hind legs and peeped over at the player. When the musician retreated from the cage, the animals came to the front of it and did not move back when he gradually drew so near as almost to touch the great paws which were thrust through the bars. When playing 'Home, Sweet Home,' the entire family seemed very attentive, and were motionless except that the cubs turned their heads from side to side. Then another jig was played and the cubs pranced about."

"The Coyotes in a den, squatted in a semicircle, and sat silently while the music continued. When it ceased, they ran up and pawed at the player through the bars. He began afresh, and they again formed in a silent semicircle. This experiment was tried several times with the same results."

Of late years the Sea Gulls have found it so much to their interest to come up to the Thames in our midst that their graceful evolutions around the crowded bridges in ever growing flocks has almost ceased to excite notice. But this year, as never before, they have descended upon the water of St. James Park in such great numbers that their presence must considerably exercise the minds of those responsible for the welfare of the other wild fowl there. They may be seen sometimes resting upon the surface of the eastern half of the lake in sufficient number almost to hide the water.

And at the luncheon hour, when released workers throng bank and bridge, bestowing upon the water the scanty fragments of their frugal meals, the gulls, on ready wing, with an agility born of long practice over stormy seas, give the clumsier Ducks and Geese hard work to obtain even a small share of what is going. Not so long ago a piece of plain bread might often float uneaten until it sank waterlogged for the benefit of the fish. It is so no longer. No crumb now goes a-begging or is scouted by any of the old habitues as beneath their notice.—

London Paper.

those of a tiny file, and on the inner margin toward the base from the end of the principal vein, a hardened portion, which may be called the scraper. | By using the files and scrapers of their fore wings the little musicians add their notes to the universal music of the world. ELLANORA KINSLEY MARBLE.

A LITTLE BIRD.

A little Bird in a tree
Made one—a man and maiden three.
'Twas not by chance that they had met!
“None see,” they said; one can forget
A little Bird.

A long hot road, a strip of grass,
'Twould tempt the Fates to let it pass!
Two people linger in the walk;
There's only one to hear them talk,
A little Bird.

Long shadows stretched across the sky,
Two people parted with a sigh,
But there was no one there to see!
How do I know? and who told me?
A little Bird.

—E. R. C.

THE TURKEY'S FAREWELL.

I go, but I return.
The fiery furnace has no horrors for me.
Mine is a race of martyrs. I can trace
Ancestors by the score who laid their heads
Upon the axman's block. It is a little way
We have. Why should I care to flaunt
My feathered beauty on a bare November bough?
I shall appear again in a far richer dressing.
In years to come it will be said of me,
As of my ancestors, that nothing in my life
Shed so much glory as the leaving of it.
Full many a little child that now
Is prattling at its grandma's knee shall say
In future years that of all days it holds
In the most sacred memory the one
When it officiated at
The funeral of this Turk. And now
Lest some one shall say I knew not how to die,
Let the ax fall.

BIRDS.

THE BIRD is little more than a drift of the air brought into form by plumes; the air is in all its quills, it breathes through its whole frame and flesh, and glows with air in its flying, like a blown flame; it rests upon the air, subdues it, surpasses it, outraces it—is the air, conscious of itself, conquering itself, ruling itself.

Also, into the throat of the Bird is given the voice of the air. All that in the wind itself is weak, wild, useless in sweetness, is knit together in its song. As we may imagine the wild form of the cloud closed into the perfect form of the Bird's wings, so the wild voice of the cloud into its ordered and commanded voice; unwearied, rippling through the clear heaven in its gladness, interpreting all intense passion through the soft spring nights, bursting into acclaim and rapture of choir at daybreak, or lisping and twittering

among the boughs and hedges through heat of day, like little winds that only make the Cowslip bells shake, and ruffle the petals of the Wild Rose.

Also, upon the plumes of the Bird are put the colors of the air; on these the gold of the cloud, that cannot be gathered by any covetousness; the rubies of the clouds, the vermilion of the cloud-bar, and the flame of the cloud-crest, and the snow of the cloud, and its shadow, and the melted blue of the deep wells of the sky—all these, seized by the creating spirit, and woven into films and threads of plume; with wave on wave following and fading along breast and throat and opened wings, infinite as the dividing of the foam and the sifting of the sea-sand; even the white down of the cloud seeming to flutter up between the stronger plumes, seen, but too soft for touch.—RUSKIN.

BIRDS IN STORMS.

DURING windstorms birds may sometimes be seen flying overhead at a great height. When this is observable, it is said it may be taken for granted that the upper atmosphere is comparatively quiet, and the disturbance is confined chiefly to the lower regions. Many seabirds seek the upper air of comparative quietness during tropical hurricanes. A writer in the *Boston Transcript* says that when a heavy wind or gale springs up, the Gulls, Terns and Petrels will fly back and forth over the water's surface, rising and falling, and uttering their peculiar cries of warning. If the storm extends too high up they will drift gradually with the wind, or fly away on the edge of the hurricane. Very often they get caught unexpectedly in the gales of wind, and they find themselves in a dangerous position. Then they struggle with might and

main against the powers of the air currents. Knowing that danger and death face them if they once come under the dominion of the wind, they use all the strength and tactics they are capable of to combat the elements. A young Herring Gull, a Petrel, or a Tern thus surprised will beat up against the wind with powerful flight. It will rise high in the air, facing the gale, and making a little progress forward as well as upward. Then it will suddenly descend with rapid flight toward one side of the storm-swept path, but falling off at the same time in the direction of the blowing wind. Once more it will sweep around and face the storm, ascending heavenwards and striking desperately out toward the direction of the storm. By pursuing these tactics, the bird will gradually work itself to one side of the storm centre.

THE SLEEPING-PLACES OF BIRDS.

IT IS difficult to imagine a spot with fewer domestic features to adorn the home than a piece of the bare ceiling of a tropical veranda; but the attachment of animals to their chosen sleeping-places must rest on some preference quite clear to their own consciousness, though not evident to us. In some instances the ground of choice is intelligible. Many of the small blue British Butterflies have grayish spotted backs to their wings. At night they fly regularly to sheltered corners on the chalk downs where they live, alight head downwards on the tops of the grasses which there flourish, and closing and lowering their wings as far as possible, look exactly like seed-heads on the grasses. If the night is cold they creep down the stem and sleep in shelter among the thick lower growth of grass. The habits of birds in regard to sleep are very unlike, some being extremely solicitous to be in bed in good time, while others are awake and about all night. But among the former the sleeping-place is the true home, the *domus et penetralia*. It has nothing necessarily in common with the nest, and birds, like some other animals and many human beings, often prefer complete isolation at this time. They want

a bedroom to themselves. Sparrows, which appear to go to roost in companies, and sometimes do so, after a vast amount of talk and fuss, do not rest cuddled up against one another, like Starlings or Chickens, but have private holes and corners to sleep in. They are fond of sleeping in the sides of straw-ricks, but each Sparrow has its own little hollow among the straws, just as each of a flock of sleeping Larks makes its own "cubicle" on the ground. A London Sparrow for two years occupied a sleeping-home almost as bare of furniture as the ceiling which the East Indian Butterfly frequented. It came every night in winter to sleep on a narrow ledge under the portico of a house in Onslow Square. Above was the bare white-washed top of the portico, there were no cosy corners, and at eighteen inches from the Sparrow was the gas-lit portico lamp. There every evening it slept, and guests leaving the house seldom failed to look up and see the little bird fast asleep in its enormous white bedroom. Its regular return during two winters is evidence that it regarded this as its home; but why did it choose this particular portico in place of a hundred others in the same square?—*Spectator*.

BIRD COURTSHIPS.—When he (the Flicker) wishes to charm his sweetheart he mounts a very small twig near her, so that his foreparts shall not be hidden as he sits upright in regular Woodpecker attitude, and he lifts his wings, spreads his tail, and begins to nod right and left as he exhibits his mustache to his charmer, and sets his jet locket first on one side of the twig and then the other. He may even go so far as to turn his head half around to show her the pretty spot on his "back hair." In doing all this he per-

forms the most ludicrous antics, and has the silliest of expressions of face and voice, as if in losing his heart, as some one phrases it, he has lost his head also. For days after she has evidently said yes, he keeps it up to assure her of his devotion, and, while sitting crosswise on a limb, a sudden movement of hers, or even a noise made by one passing, will set him to nodding from side to side. To all this she usually responds in kind.—*Baskett*.



THE SHARP-TAILED GROUSE.

In open woodlands far remote
The Sharp-tails utter their cackling note,
And on the wild prairie ground
Their simple nest and eggs are found.

Long years ago, in countless pairs
They courted, danced, and "put on airs,"
But hunters, greedy, cruel—strange!
Have driven them beyond their range.

C. C. M.

A WELL-KNOWN observer, who has spent many years in the West, says that the Sharp-tailed Grouse, being a bird of the wild prairies and open woodlands, has gradually retreated westward as the settlements have advanced, and will soon be a rare bird, to be looked for only in the sand-hills and unsettled portions of the country.

During the summer months this bird inhabits the open prairies, retiring in winter to the ravines and wooded lands, and when the snow is deep and the weather severe often hides and roosts beneath the snow. This sometimes proves the destruction of the birds, the entrance to the roosting-place being filled by falling snow and frozen over.

The Sharp-tails feed chiefly on Grasshoppers, seeds, buds, blossoms, and berries.

"When walking about on the ground they stand high on their legs, with their sharp-pointed tails slightly elevated, and when flushed, rise with a whirring sound of the wings, uttering as they go a guttural *kuk-kuk-kuk*, and swiftly wing themselves away in a direct course. The birds have several cackling notes, and the males a peculiar crowing or low call, that in tone sounds somewhat

like the call of the Turkey. In the early spring, as the love season approaches, they select a mound or slight elevation on the open prairies for a courtship ground, where they assemble at early dawn, the males dancing and running about in a circle before the females in a most ludicrous manner, facing each other with lowering head, raised feathers and defiant looks, crossing and recrossing each other's paths in a strutting, pompous way, seldom fighting, each acting as if confident of making the greatest display, and thus winning the admiration of and capturing the hen of his choice. These meetings and dances are kept up until the hens cease laying and begin to sit."

These Grouse place the nest in a tuft of grass or under a low, stunted bush. A hollow in the ground is worked out to fit the body and lined with a few blades of grass arranged in a circular form. The hens attend wholly to the hatching and rearing of the young and are attentive and watchful mothers.

The flesh of the Sharp-tail is lighter in color and more highly esteemed than that of the Prairie Hen, and the bird is therefore hunted more industriously.

TAME BATS.

THE Bat is a harmless little animal, but I doubt if many of us would care to have a number of them flying around. The hotter the climate the more Bats you will find. As evening draws nigh, even in Italy, Greece, and Spain, out of their nooks and corners thousands of them fly, fluttering over the fields, through the gardens and streets of the town, through houses and rooms.

People get used to them there, and when awakened by the noise of their wings will get up, chase them from the room with a stick, and though aware they will return again when all is quiet, lie down again and go to sleep.

You would scarcely think to look at these lively little animals that they could be tamed and become strongly attached to their masters, would you? But indeed they are very intelligent and many naturalists have made pets of them, training them to take food from their hands or search for it in a glass. They will follow the one they love all over the house, and show themselves very amiable and sensible, too.

One cold spring morning a lady with a sympathetic heart—a true Christian lady I should judge, since she loved all things “both great and small”—saw a boy tossing in the air a little animal which she took to be a Mouse. Even so insignificant a creature should not be needlessly tortured, so she went at once to its rescue. Instead of a Mouse

she found it to be a Bat, half-dead from cold and fright. With tender hands she placed it upon some cotton in the bottom of a basket and set it near the fire. Many times she peeped into the basket and was at length delighted to see the little creature hanging bat-fashion on the side of the basket, its keen, bright eyes watching every movement. One of its feet she found was crushed. With trembling hands she severed the bit of skin by which it hung, and applied some healing salve to the wound. The poor little creature suffered too much to taste food, but after a few days accepted a Fly from her hands, then a bit of meat, after which it folded its wings to signify it had enough.

The Bat at length became as tame as a Mouse and would hang itself to any convenient portion of its mistress' dress; would eat whatever of animal food she gave it, and lick milk off her fingers. At night it would settle upon her hair, but never went near other members of the family; would fly about the room, and go out of the window in search of insects, returning in a couple of hours, and if the window was closed hang to the window-sill, or to the sash, until admitted. Thus it lived for two years, a happy, contented Bat, till one night it flew out and never returned—a prey probably to some White Owls who for years had made their home in an old belfry near by.

RED AND BLACK BATS.

Over the houses, in the windows, fluttering everywhere,
Like Butterflies gigantic, the Bats dive through the air;
Up and down, hither, thither, round your head and away,
Look where they wander, coming ever with vanishing day.

C. C. M.

BATS are so much alike, especially those common to this country, of which there are numerous species known to naturalists, that the description of one will serve for all, with the exception of the Vampire.

The sub-order of smooth-nosed Bats is represented in this country by several species peculiar to America. The most common in all the Atlantic coast states is the Red Bat, or New York Bat, which is a busy hunter of flying insects, which it follows so persistently that it frequently flies into rooms in pursuit of its favorite prey. It flies rather slowly, but it changes the direction of its flight very rapidly, and its movements in the air are very graceful. Besides this species is the Black Bat, and several others have been observed and described, but so far the descriptions, according to Brehm, have been principally technical, and little or nothing is known of their habits, except that no North American species seems to be harmful, but the contrary, as they are all insect-eaters.

The principal food of these Bats consists of Butterflies, Beetles, Mosquitoes, and the like.

All Bats sleep by day and fly about by night. Most of them make their appearance at dusk, and retire to their hiding-places long before dawn. Some species appear between three and five o'clock in the afternoon and flicker merrily about in the bright sunshine. Each species has its own hunting-grounds in forests, orchards, avenues, and streets, and over stagnant or slowly flowing water-surfaces. It is said to

be rare that they fly over open fields, for the reason that there is no game for them. In the South they haunt the rice fields, where insects are numerous. Their hunting-ground is limited, although some large species will cover a mile in their flight, and the Bats of the tropics fly over much greater distances.

Bats are in general very much averse to the ground, and never voluntarily place themselves on a level surface. Their method of walking is very curious. First the forelegs or wings are thrust forward, hooking the claw at its extremity over any convenient projection, or burying it in the ground. By means of this hold the animals draw themselves forward, then raising their bodies partly off the earth advance the hind-leg, making at the same time a tumble forward. The process is then repeated on the opposite side, and thus they proceed in a strange and unearthly fashion, tumbling and staggering along as if their brains were reeling.

It has long been known that Bats are able to thread their way among boughs of trees and other impediments with an ease that seems almost beyond the power of sight. Even utter darkness does not apparently impede their progress, for when shut up in a darkened room, in which strings had been stretched in various directions, they still pursued their course through the air, avoiding every obstacle with precision. This faculty has been found not to result from any unusual keenness of sight, but from the exquisite nervous system of their wings.

THE OTTER.

NATURE, children, as you observe, gave my family a handsome coat. Now no bird can have fine feathers, nor beast a fine fur but men and women desire them for adornment, or possibly to keep themselves warm. So the hunters, finding it a paying business, shoot and trap us till places which once knew the Otter know us no more.

Such gentle animals as we are, too. No little girl or boy would care to have a more frolicsome playmate than a young cub Otter. He will romp with you, and play with Dog or Cat and sit up on his hindquarters, and whistle and do even many quaint tricks to make you laugh.

To make him happy you must have a little pond in the yard or a large tank, though he will run about the yard or house most of the time with the Dog. Feed him at first on bread and milk, then on fish, though you can train him to do without the latter and eat the "leavings" from the table.

Such fun as we Otters that live in the Northern part of the United States and Canada do have in winter. No school-boy enjoys coasting down hill more than we do. Though we live in the water, you may say, and are known as the fastest-swimming quadrupeds, yet, in spite of our short legs, we can run over land tolerably well, too. So we trudge along till we come to a high

hill, well covered with snow; up we scramble to the top, lie down flat on our smooth jackets, bend our fore feet backward and, giving ourselves a shove with our hind legs, down we slide head-foremost. Such fun as it is! Not till we get hungry or too tired to jog up the hill any more do we give it up for that day.

In summer we enjoy the same sport, too. How? Oh, all we want is a clay-bank with a good muddy surface, and down we go to turn a somersault into the water of the creek below. "Shooting the chutes" you little people would call it, I suppose, though we call it our "slide."

Our homes are always on the banks of a stream. We begin to burrow three or four feet below the surface of the water, forming a tunnel which leads to a chamber in the bank high and dry. That is called our den and we line it with grass and live very comfortably.

Being a hunted animal our senses are very acute. When on land we are always on the alert and, at the approach of danger, down we go into the water and hide in our dens. After sunset we go out to fish. We beat the surface of the water with our tails and frighten the scaly fellows so that they seek refuge under stones or in holes in the bank. Then we catch our Fish. For a change we eat Crabs, Frogs, and sometimes small birds.



THE AMERICAN OTTER.

In holes on river banks the Otter makes his home;
From solitude—wild nature haunts—he never cares to roam;
But swimming in the waters and sliding down the hills,
He plays the games of boys and girls, and fishes in the rills.
Alas! the hunter sets his traps, to take him unawares,
With springs of wire and teeth of steel unhappily he fares;
His fur is fine, and soft, and warm, and ladies vain adore it,
With ne'er a thought of pity for the little beast that bore it!

C. C. M.

IN ALL parts of temperate North America this, the most interesting of the Otter family, makes its home on the banks of nearly all streams except those from which it has been driven by man. It is much larger than the European Otter, has a longer tail, and has a nasal pad between the nostrils which is larger than that of any other species. Though closely allied to the common species, it has distinctive differences which entitle it to be classed as a separate species. Its habits resemble those of its cousins, but it has one peculiarity that is noticed by naturalists who have studied this animal, which is the habit of sliding or coasting down hill, in which it displays a remarkable skill. In Canada, and other sections where the snow is plentiful, Otters indulge freely in this sport, and, says Godman, they select in winter the highest ridge of snow they can find, scramble to the top of it," lie on their bellies with the forefeet bent backwards and then, giving themselves an impulse with their hindlegs, glide head-foremost down the declivity, sometimes for the distance of twenty yards. This sport they continue, apparently with the keenest enjoyment, until fatigue or hunger induces them to desist."

The young are born in April in the northern, and earlier in the southern part of the Otter's range, and a litter is composed of from one to three young ones.

Authorities agree that the number of the Otters is rapidly decreasing in America, because of the systematic way in which they are pursued by trappers for the value of their fur. The skin of the American Otter is in high reputation and general use with furriers, but those from Canada are said

to be more valuable than those from the more southern sections.

The Otter, when taken young, is easily tamed. Audubon had several young Otters which he says "became as gentle as Puppies in two or three days. They preferred milk and boiled corn meal, refusing fish or meat till they were several months old." They became so tame that they would romp with their owner, and were very good-natured animals.

Rivers whose banks are thickly grown with forests are the favorite home of the Otter. There, says Brehm, it lives in subterranean burrows, constructed in accordance with its tastes and mode of life. "The place of exit is always located below the surface of the water, usually at a depth of about eighteen inches; a tunnel about two yards long leads thence, slanting upwards into a spacious chamber, which is lined with grass and always kept dry. Another narrow tunnel runs from the central chamber to the surface and aids in ventilation. Under all circumstances the Otter has several retreats or homes." When the water rises, it has recourse to trees or hollow trunks.

The Otter is the fastest swimming quadruped known. In the water it exhibits an astonishing agility, swimming in a nearly horizontal position with the greatest ease, diving and darting along beneath the surface with a speed equal, if not superior, to that of many fishes.

The Otter, said an eminent naturalist, is remarkable in every way; in its aquatic life, as well as in its movements; in its hunt for food and in its mental endowments. It belongs without question to the most attractive class of animals.

THE SKYLARK.

JOHN BURROUGHS relates that a number of years ago a friend in England sent him a score of Skylarks in a cage. He gave them their liberty in a field near where he lived. They drifted away, and he never heard or saw them again. But one Sunday a Scotchman from a neighboring city called on him and declared, with visible excitement, that on his way along the road he had heard a Skylark. He was not dreaming; he knew it was a Skylark, though he had not heard one since he had left the banks of the Doon, a quarter of a century or more before. The song had given him infinitely more pleasure than it would have given to the naturalist himself. Many years ago some Skylarks were liberated on Long Island, and they became established there, and may now occasionally be

heard in certain localities. One summer day a lover of birds journeyed out from the city in order to observe them. A Lark was soaring and singing in the sky above him. An old Irishman came along and suddenly stopped as if transfixed to the spot. A look of mingled delight and incredulity came into his face. Was he indeed hearing the bird of his youth? He took off his hat, turning his face skyward, and with moving lips and streaming eyes stood a long time regarding the bird. "Ah," thought the student of nature, "if I could only hear the bird as he hears that song—with his ears!" To the man of science it was only a bird song to be critically compared to a score of others; but to the other it brought back his youth and all those long-gone days on his native hills!

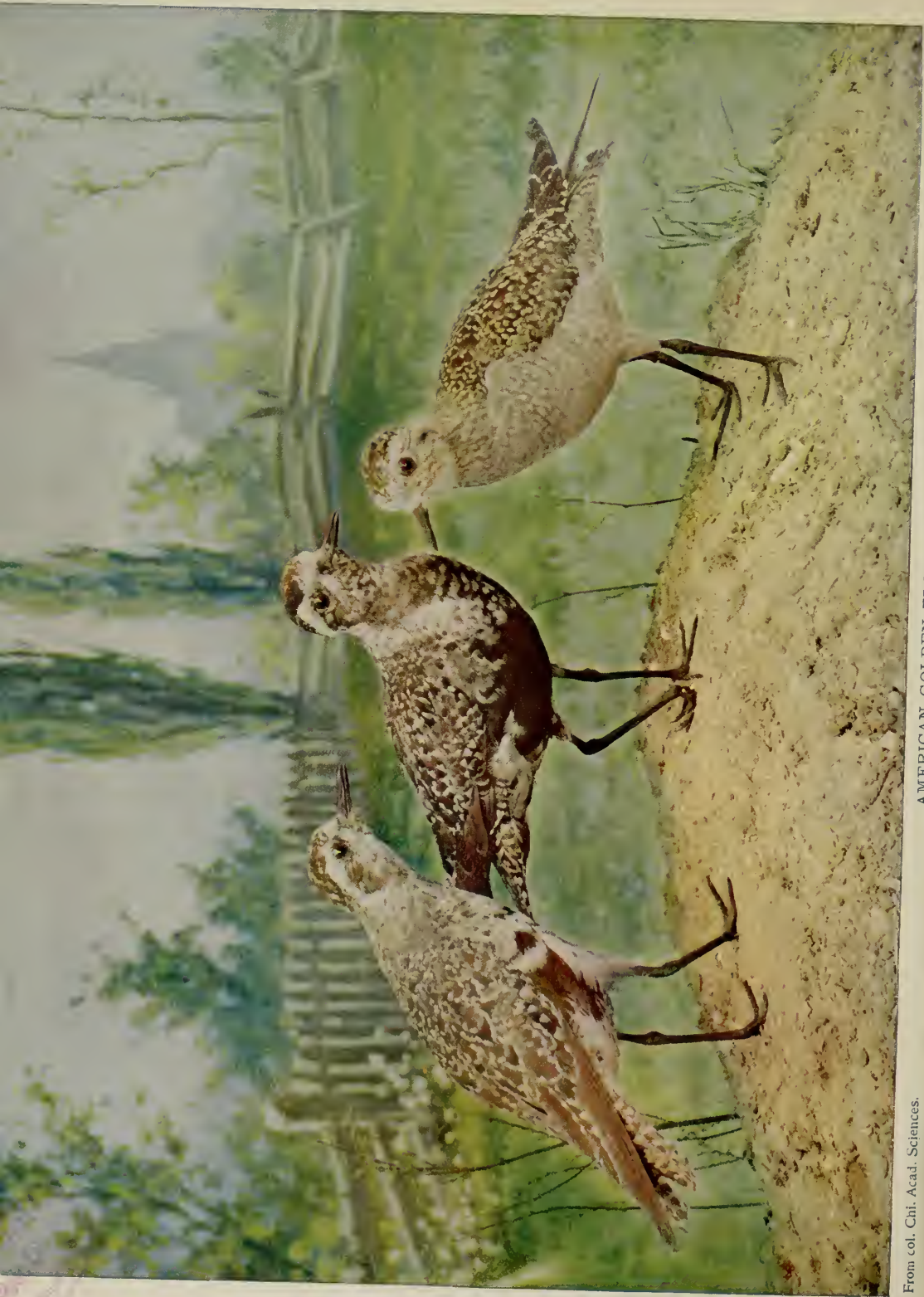
NATURE STUDY AND NATURE'S RIGHT.

There is another study which should go hand in hand with nature-work—nature's rights, people's rights. Too many little feet are learning to trespass; too many little hands are learning to steal, for that is what it really is. Children are young and thoughtless and love flowers. But does loving and wishing for things which are not ours make it right to take them? If the teacher can develop the love of nature, can she not develop the sense of honor also? Cannot the moral growth and the mental growth of the child develop together?

To love nature is not to ruthlessly rob her of her treasures. Therefore in

collecting for the school-room teach the children to use thought and care in breaking the tender branches. They should remember that each flower on the fruit-tree will in time become fruit. Mother Nature has taken time and loving care to bring forth the leaves and flowers. The different parts of the flowers may be studied without sacrificing many blossoms.

And the birds, why rob them of nests or eggs? Many ways can be found for studying nests, eggs, and birds, without causing suffering. Nature and science study, taught by the thoughtless teacher, can do much harm.—*A. G. Bullock in School Journal.*



From col. Chi. Acad. Sciences.

AMERICAN GOLDEN PLOVER.
 $\frac{1}{2}$ Life-size

Copyright by

AMERICAN GOLDEN PLOVER.

GOLDEN YELLOW RUMP is one of the names often applied to this most beautiful member of the Plover family, which is thus made conspicuous and easily recognizable. It is found everywhere in the United States, from the Atlantic to the Rocky Mountains, but is rare on the Pacific coast south of Alaska. They are seldom found far inland, their natural home being on the seacoast, occasionally frequenting marshy or wet grounds, though as a rule they prefer the sandy beach and adjacent flats and uplands. During migration their flight, especially in the spring, is hurried, direct and in the night, only stopping to rest and feed during the day, returning, it is said, in a more leisurely manner and largely along the seashore. When on the ground these birds run about on unbended legs, the bodies in a horizontal position and heads drawn down. While sleeping or resting they usually sit or stand on one leg. Captain Houdlette of the Oceanic Steamship Company caught a Plover that came aboard his ship while on its way from Alaska to Hawaii. These birds are not web-footed, and the captain seems to have solved the problem as to whether they ever rest on the water during their long flights. He says they do. "It was during the run from San Francisco to Honolulu that I saw several Plovers in the water resting. When the steamer came too near they would rise with a few flaps of their wings, but, being very tired, they would soon settle back into the water again. In its efforts to get away one of them came on board and

it lived for some time. I always thought the birds made a continuous flight of over 2,000 miles, but I am now satisfied that they rest on the waves when tired."

The flight of a flock of Golden Plovers is described by Goss as swift and strong, sweeping over the prairies in a compact, wavy form, at times skimming close to the ground, then high in the air; an everchanging, circling course, whistling as they go; and on alighting raising their wings until the tips nearly touch, then slowly folding them back, a habit which is quite common with them as they move about the ground.

Plovers eat Grasshoppers, Beetles, and many forms of insect life; small berries are also a part of their diet.

Mr. Nelson, in his "Report Upon Natural History Collections in Alaska," gives a full and interesting account of their nesting-habits. He says the courtship of this handsome bird is carried on very quietly, and there is no demonstration of anger or quarreling among the rivals. When two are satisfactorily mated they quietly go about their nesting, after which each pair limits its range to the immediate vicinity of its treasures. The eggs are deposited the latter part of May in a small depression among the moss and dried grass of a small knoll, and at times a slight structure is made of dried grass. Four eggs are laid, of a pale yellowish ground color, with very dark, well-defined umber brown spots scattered profusely over the shell.

Golden Plovers on the ground,
See them rise, and fly, and sing;
Where before was not a sound
Now the very echoes ring.

CAN ANIMALS COUNT?

MY LITTLE readers have heard their elders when speaking of the Horse, Dog, Cat, and other dumb creatures call them the "lower" animals. Well, so they are, but when you have grown to be men and women you may possibly prefer the faithful affection and good comradeship of one of these lower animals to the disagreeable society of a cold, mean, and selfish "higher" one. Indeed, to learn how near akin are man and beast, mentally, not physically, men and women of large and tender natures have given up the greater part of their lives. Many stories have been written concerning the faithful love of animals for their masters, big and little, of their marvelous instinct and almost human cunning, but when I tell you that animals can be taught to count—and birds are animals, too, you know—why, then, if you are bright children you will wonder, as your elders do, where instinct ends and reason begins. However, these animals, of which I am going to write, may have been more than usually intelligent and capable of learning where others would not.

A few years ago a confectioner bought a Parrot, and, though the bird talked very plainly and volubly, the man was not satisfied. He desired his bird to display more cleverness than the ordinary Parrot, so he conceived the idea of teaching her to count. Polly didn't take to figures at all; but, though she listened with a great deal of patience to what her teacher had to say she uttered never a word. When at length he turned away discouraged, Polly croaked, "Shut up," and turned a double somersault on her perch, evi-

dently very glad indeed that school was over.

Day after day Polly had her lesson, but count aloud she would not. Still the confectioner didn't give up the idea, and one day, to the bird's amazement her teacher, at lesson time, stood before the cage with a pan of water and a whisk broom in his hand. Dipping the broom in the water and flitting the drops over her head the teacher said, "One." Giving her time to think the matter over, a few more drops were sprinkled upon her head, the teacher exclaiming, "Two," and so on in this way till he had reached ten. This method of instruction went on for some time; but, though Polly came near being drowned in several of the lessons, she stubbornly refused to repeat the figures after her teacher. Arithmetic was not her forte, and the confectioner at length gave up in despair, very much I fancy to Miss Polly's relief.

A month or more went by, when one day, as the bird in her cage was hanging out of doors, it suddenly began to rain. "One," the delighted confectioner heard Polly say, as the big drops fell upon her head, then "two, three, four, five, six, seven, eight, nine, ten," in rapid succession. But to the Parrot's vexation the rain did not cease as it was wont to do when taking her lesson, and every additional drop increased her anger. Finally she could stand it no longer, and in her shrillest tones shouted: "Stop it, stop it! That's all I know, hang it, that's all I know!"

The confectioner says no amount of money can buy that bird.

The Crow, an eminent doctor in

Russia says, can be taught, if you have the patience, to count up to ten, while a certain tribe of men in Polynesia, "higher" animals, you know, cannot be taught to count beyond five or six.

This same doctor had an intelligent Dog which was accustomed, like other Dogs, to bury his surplus bones in the garden. In order to test the mental powers of this animal the doctor one day gave him no less than twenty-six bones, every one of which he saw the Dog duly bury in separate places. The next day no food was given him at meal time, but he was commanded by his master to dig up the bones. This the intelligent fellow proceeded to do, but after uncovering ten came to a full stop. After whining and running about in great perplexity he finally succeeded in unearthing nine more. Still he seemed conscious that he had not found the full number and kept up the search till he had fetched to his master the other seven.

I think that was too much to ask of any Dog, don't you? Many a little boy or girl who goes to school couldn't count that number of bones, though you can, of course.

Well, the doctor then turned his attention to the Cat. When pussy was good and hungry a tempting morsel of meat was held under her nose, then withdrawn five times in succession; the sixth time she was permitted to secure it. This was repeated every day, till she got accustomed to waiting for the presentation of the meat five times; but upon the sixth Pussy never failed to spring forward and seize the meat. The doctor attempted the experiment with a higher number, but the Cat stuck to her first lesson and after counting one, two, three, four, five, six, would invariably make the spring. Had he begun with ten Pussy might

have shown herself capable of counting that number as well as the Crow and the Parrot.

A farmer tells of a Horse which in plowing had acquired the habit of counting the furrows, stopping for a rest regularly at the twentieth row. The farmer at the end of the day used to estimate the amount of work done, not by counting the furrows but by remembering how many times the Horse had stopped to rest. The poor animal had never been taught his figures, and his mind did not say "one, two, three," and so on, but all the same he had his way of counting, and never failed to know when he had reached twenty.

Still another Horse was able to count the mile-posts and had been trained by its master to stop for feed when they had covered eighteen miles of a certain road. He always stopped after passing the eighteenth post. To test him they put up three false mile-posts between the real ones, and, sure enough, deceived by the trick, he stopped at the eighteenth post for his oats, unaware that he had not covered eighteen miles.

The doctor also observed another Horse which was accustomed to receiving his oats precisely at noon. Whenever the clock struck an hour the Horse pricked up his ears as if counting the strokes. If he heard twelve, off he would trot to be fed, but if a less number he would plod on resignedly at his work. The experiment was made of striking twelve strokes at the wrong time, whereupon the Horse started for his oats though he had been fed only an hour before.

All of which goes to prove that the capacity of an animal's mind is limited, and, so you may say, is that of the average man.

MRS. E. K. MARBLE.

BUTTERFLIES LOVE TO DRINK.

BUTTERFLIES have never had a character for wisdom or foresight. Indeed, they have been made a type of frivolity and now something worse is laid to their charge. In a paper published by the South London Entomological society Mr. J. W. Tutt declares that some species are painfully addicted to drinking. This beverage, it maybe pleaded, is only water, but it is possible to be over-absorptive of non-alcoholics. Excess in tea is not unknown—perhaps the great Dr. Johnson occasionally offended in that respect—and even the pump may be too often visited. But the accuser states that some Butterflies drink more than can be required by their tissues under any possible conditions. It would not have been surprising if, like some other insects, Butterflies had been almost total abstainers, at any rate, from water, and had contented themselves with an occasional sip of nectar from a flower.

MALES ARE THE SINNERS.

The excess in drinking seems to be almost a masculine characteristic, for the toppers, he states, are the males. They imbibe while the females are busy laying eggs. This unequal division of pleasure and labor is not wholly unknown even among the highest of the vertebrates; we have heard of cases where the male was toying at the "public" while the female was nursing the children and doing the drudgery of the household. Mr. Tutt has called attention to a painful exhibition of depravity which can often be observed in an English country lane, where shallow puddles are common, but never so well as on one of the rough paths that wind over the upper pastures in the Alps. Butterflies are more abundant there than in England, and they may be seen in dozens absorbing the moisture from damp patches. Most species are not above taking a sip now and again, but the majority may be classed as "mod-

erate drinkers." The greater sinners are the smaller ones, especially the blues, and the little Butterfly which, from its appearance, is called the "small copper." There they sit, glued as it were to the mud—so besotted, such victims to intemperance, that they will not rise till the last moment to get out of the way of horse or man. Some thirty years ago Prof. Bonney in his "Alpine Regions," described this peculiarity, saying that "they were apparently so stupefied that they could scarcely be induced to take wing—in fact, they were drunk."

OTHER LIQUIDS ARE LIKED.

If we remember rightly, the female occasionally is overcome by the temptation to which her mate so readily falls a victim. But we are by no means sure that Butterflies are drinkers of water only. Certainly they are not particular about its purity; they will swallow it in a condition which would make a sanitarian shudder; nay, we fear that a not inconsiderable admixture of ammoniacal salts increases the attraction of the beverage. It is admitted that both Moths and Butterflies visit sugar, overripe fruit, and the like, but it is pleaded that they do this for food. Perhaps; but we fear this is not the whole truth. The apologist has forgotten that practice of entomologists called "sugaring," which is daubing trunks of trees and other suitable places with a mixture of which, no doubt, sugar is the main ingredient, but of which the attraction is enhanced by a little rum. Every collector knows what a deadly lure this is, and what treasures the dark-lantern reveals as he goes his rounds. True, this snare is fatal only to the Moth, because at night the Butterfly is asleep. If he once adopted nocturnal habits we know where he would be found, for he is not insensible by day to the charms of this mixture.

THE ENVIOUS WREN.

On the ground lived a Hen,
In a tree lived a Wren,
Who picked up her food here and there;
While Biddy had wheat
And all nice things to eat
Said the Wren, "I declare, 'tisn't fair!

"It is really too bad!"
She exclaimed—she was mad—
"To go out when it's raining this way!
And to earn what you eat,
Doesn't make your food sweet,
In spite of what some folks may say.

"Now, there is that Hen,"
Said this cross little Wren,
"She's fed till she's fat as a drum;
While I strive and sweat
For each bug that I get,
And nobody gives me a crumb.

"I can't see for my life
Why the old farmer's wife.
Treats her so much better than me.
Suppose on the ground
I hop carelessly round
For awhile, and just see what I'll see."

Said this cute little Wren,
"I'll make friends with the Hen,
And perhaps she will ask me to stay;
And then upon bread
Every day I'll be fed,
And life will be nothing but play."

So down flew the Wren;
"Stop to tea," said the Hen;
And soon Biddy's supper was sent;
But scarce stopping to taste,
The poor bird left in haste,
And this was the reason she went:

When the farmer's kind dame
To the poultry yard came,
She said—and the Wren shook with fright—
"Biddy's so fat she'll do
For a pie or a stew,
And I guess I shall kill her to-night."

—Pharbe Cary.

THE CANADIAN PORCUPINE.

It climbs the trees and strips them clean
Of leaf, and fruit, and bark;
Then, creeping where no life is seen,
O'er branches grim and stark,
Begins anew, the bark beneath,
The endless grind of claws and teeth,
Till trees, denuded, naked rise
Like spectres painted on the skies.
Fretful it may be, as its quills are sharp,
But with its teeth it stills the sylvan harp.
C. C. M.

FORMERLY plentiful in the northern United States, but now quite rare in this country, although not so scarce in Canada, is the Urson, otherwise called the Canadian Porcupine. It is the tree or climbing species and is distinguished from other members of the family by its slender body and tail of greater or less length. The Urson attains a length of thirty-two inches, seven and one-half of which are included in the tail. A thick set fur, which attains a length of four and one-half inches on the nape of the neck and changes into sharp spines on the under parts of the body and the tip of the tail, clothes the animal.

The Canadian Porcupine is a native of the forests of North America, ranging as far south as Virginia and Kentucky and as far west as the Rocky Mountains. "The Urson," says Cartwright, "is an accomplished climber and probably never descends a tree in winter, before it has entirely denuded the upper branches of bark. It is most partial to the tenderest roots or seedling trees. A single Urson may ruin hundreds of them during one winter." Audubon states that he passed through woods, in which all the trees had been stripped by this animal, producing an appearance similar to that induced when a forest has been devastated by fire. Elms, Poplars, and Firs furnish its favorite food, and therefore usually suffer more than other trees from its destructiveness.

The nest of this Porcupine is generally found in holes in trees or rocky hollows, and in it the young, usually two, more rarely three or four in number, are born in April or May. The

young are easily tamed. Audubon says that one which he possessed never exhibited anger, except when some one tried to remove it from a tree which it was in the habit of mounting. It had gradually become very tame and seldom made any use of its nails, so that he would open its cage and afford it a free walk in the garden. When he called it, tempting it with a sweet potato or an apple, it turned its head toward him, gave him a gentle, friendly look and then slowly hobbled up to him, took the fruit out of his hand, sat down on its hind legs and raised the food to its mouth with its fore-paws. Frequently when it would find the door of the family room open it would enter, approach and rub itself against a member of the family looking up pleadingly as if asking for some dainty. Audubon tried in vain to arouse it to an exhibition of anger. When a Dog came in view matters were different. Then it instantly assumed the defensive. With its nose lowered, all its quills erect, and its tail moving back and forth, it was ready for the fray. The Dog sprang upon the Porcupine with open mouth. That animal seemed to swell up in an instant to nearly double its size, sharply watched the Dog and at the right moment dealt it such a well-aimed blow with its tail that the Mastiff lost courage and set up a loud howl of pain. His mouth, tongue, and nose were full of Porcupine quills. He could not close his jaws, but hurried open-mouthed off the premises. Although the spines were immediately extracted, the Dog's head was terribly swollen for several weeks afterward, and it was months before he entirely recovered.



THE DEATH OF THE FLOWERS.

The melancholy days are come, the saddest of the year,
Of wailing winds, and naked woods, and meadows brown and sear.
Heaped in the hollows of the grove, the autumn leaves lie dead;
They rustle to the eddying gust, and to the Rabbit's tread.
The Robin and the Wren are flown, and from the shrubs the Jay,
And from the wood-top calls the Crow through all the gloomy day.

Where are the flowers, the fair young flowers, that lately sprang and stood
In brighter light, and softer airs, a beauteous sisterhood?
Alas! they all are in their graves, the gentle race of flowers
Are lying in their lowly beds, with the fair and good of ours.
The rain is falling where they lie, but the cold November rain
Calls not from out the gloomy earth the lovely ones again.

The Wind-flower and the Violet, they perished long ago,
And the Brier-rose and the Orchis died among the summer glow;
But on the hill the Golden-rod, and the Aster in the wood,
And the yellow Sun-flower by the brook in autumn beauty stood,
Till fell the frost from the clear, cold heaven, as falls the plague on men,
And the brightness of their smile was gone, from upland, glade, and glen.

And now, when comes the calm, mild day, as still such days will come,
To call the Squirrel and the Bee from out their wintry home;
When the sound of dropping nuts is heard, though all the trees are still,
And twinkle in the smoky light the waters of the rill,
The south wind searches for the flowers whose fragrance late he bore
And sighs to find them in the wood and by the stream no more.

—Bryant.

THE CASPIAN TERN.

The Terns are on the wing,
See them play!
They dart into the sky,
They poise, and scream, and fly
O'er the bay;
Round the ship that sails the sea,
Round the lighthouse o'er the lea—
The Terns are on the wing!

C. C. M.

THE great Caspian Tern is the largest of the family, its wings, when extended, measuring from fifty to fifty-five inches in length. It is a bird of very irregular distribution, breeding in Labrador, along the Arctic coast, on islands in Lake Michigan, on the coasts of Virginia, Texas, and California, and is numerous in Australia. Forbes found it to be more or less common about Washoe Lake and the Humboldt Marshes, Nevada, and the Great Salt Lake, Utah, where it was no doubt breeding. He says that unlike most other Terns, particularly unlike the almost equally large Royal Tern, the Caspian appears to breed in isolated pairs instead of large colonies, its nest being found far removed from that of any other bird, and consisting merely of a shallow depression scooped in the sand, in which its two eggs are laid, with little if any lining, though a few grass or sedge blades or other vegetable substance are sometimes added. It is very bold in defense of its eggs or young, darting impetuously at the intruder, uttering meanwhile hoarse barking or snarling cries.

This elegant and graceful bird is also known as the Imperial Tern. At a distance it is often mistaken for the Royal Tern, but may be distinguished from the latter by its more robust form and less deeply forked tail. Eggs and young have been taken on Cobb's Island, Virginia, in July. Dr. Merrill observed it breeding on Padre Island, near Fort Brown, Texas, in May. Large numbers of this species are said to breed on Pelican Island in the Gulf of Mexico. The eggs vary from white to greenish-buff, spotted and blotched with brown and lilac of different shades.

The Terns furnish abundant interest while flying. They seem always to be on the wing, and always hungry. Like the Gulls, they seize their food by darting upon it, tossing it into the air and catching it again, without alighting. They pick up from the surface of the water floating objects. They swim on the surface, rarely diving deep. They dart also upon fish from above, and "one plows the water in flight with a knifelike beak in hopes of running through a shoal of fishes."



THE FLOWERING ALMOND.

BY EMILY C. THOMPSON.

THE Sweet, the Bitter, and the Flowering Almond are all of a kin and in this kinship many include also the Peach and the Nectarine. The Flowering Almond or the dwarf Almond is a shrub which early in the spring, in March or April, sends forth its fair rosy blossoms before its leaves are sprouted. The shrub seldom exceeds three feet in height. The leaves are like those of the willow, only darker and of a more shining green. It is really a native of Calmuck Tartary but now is used extensively in gardens because it blooms so early and can easily be cultivated in any dry soil.

The Almond tree figures in history, mythology and poetry. In the Bible we find four references to it: Exodus 25:33,34; 37:19,20; Num. 17:8; Ecc. 12:5. In this connection it is interesting to note that Aaron's famous rod was the shoot of an Almond tree. Theophrastus mentions the Almond as flourishing in Greece. Cato also tells us that it was grown, but as a luxury, in Italy. The rest of its history is obscure and all we know about its cultivation in England is that it was introduced during the reign of Henry VIII. Virgil in the Georgics welcomes the Almond when covered with blossoms as the sign of a fruitful season.

In ancient times everything that was considered of any importance to the Greeks had some connection with the siege of Troy. The Almond tree here fared especially well, for two stories have come down to us in mythology relating its connection with that wonderful event. Demophon returning from Troy suffered the fate of many

another Greek worthy. He was shipwrecked on the shores of Thrace. He was befriended by the king and received as a guest. While at the court he met the beautiful daughter of his host. Immediately he fell in love with the charming princess, gained her love in return, and made arrangements for the marriage. But Demophon was obliged to return home to settle up his affairs before he could take upon himself these new ties. So the youth sailed away, but never to return. The princess, faithful Phyllis, watched and waited, hoping in vain for the return of her promised lord. Her constancy was noted even by the gods who, when she was gradually pining away, turned her into an Almond tree. Since then this tree has been a sign of constancy and hope.

"The hope in dreams of a happier hour,
That alights on Misery's brow,
Springs out of the silvery Almond flower,
That blooms on a leafless bough."

Another version of the same story relieves Demophon of such gross inconstancy. It is reported by some that the marriage took place and not until after the couple were happily wedded was the hero called to Athens by the death of his father. Day by day the young wife watched for his return on the shore, but he was detained until the winter passed away and with it his faithful bride. In the spring he returned to find only an Almond tree awaiting his coming. He realized what had happened and in his despair clasped the tree in his arms when it burst forth into blossoms although it was bare of leaves.

COLOR PHOTOGRAPHS AND CONVERSATION LESSONS.

SINCE Nature Study Publishing Company, in January, 1897, put before the teaching world the first accurately beautiful representations, not only of the forms of nature but of the tints and colors also, the brightest minds have been active in noting the effectiveness of the color photograph in school. Thousands of teachers have vied with each other in applying them in nature study with most gratifying results.

An important discovery has been made almost at the same time by many of them. The lively interest aroused by the bird presented, the agreeable sensations the child experiences in relating incidents and hearing from his mates and teacher about its habits, and the reminiscences of delightful outdoor experiences, all tend to warm the child to enthusiasm.

This point of warmth is the supreme opportunity of the teacher. Instruction given under such a glow is intensely educative. A few minutes of such work is worth hours of effort where the child is but indifferently aroused.

Many of the best first primary teachers do not begin to teach reading during the first few weeks of the child in school. They aim, first, to establish a bond of sympathy between themselves and their pupils, to extend their range of ideas, and to expand their powers of expression. Expression is induced and encouraged along all lines, by words, music, drawing, color work, and physical motions.

The common things of life are discussed, experiences related, and the imagination brought strongly into play. Songs and recitations are given

with the actions of birds, animals, persons, or machines, imitated joyously by groups of children. Games calculated to train the senses and the memory are indulged in. The whole nature of the child is called into play, and perfect freedom of expression is sought.

Experience shows that intelligent training along these lines is profitable. The time of learning reading and spelling is somewhat deferred, and number work is delayed, but the children who are skilfully trained in this way outstrip the others rapidly when they bring their trained powers to bear upon the things that are popularly supposed to be the business of a school. Superintendent Speer has shown that pupils whose technical instruction has been deferred for several months in this way are found at the end of the second year far superior to others of equal promise, who have been put at reading, spelling, and number work directly.

To conduct a conversation lesson requires some tact. Not tact in asking questions, nor in "talking down" to the level of the children. Direct questions are of doubtful value in the first grade. In fact, the value of the lesson may sometimes be judged by the absence of such questions put by the teacher. The question mark and the pump handle resemble each other, and often force up perfunctory contributions, and sometimes they merely produce a dry sound. Children do not care to be pumped.

Here are a few questions that give the children little pleasure and less opportunity for expression: Isn't this a very pretty bird? Do you see what a bright eye it has? How many

of you have seen a bird like this? How would you like to own him, and have him at your house? Don't you think, dear children, God is very good to us to let us have such beautiful birds in the world?

Any one of these questions by itself is not harmful, but an exercise made up of such material merely gives the class a chance to say, "Yes, ma'am," and raise their hands. All talk by the teacher and no activity by the class. With a bright smile and a winning voice, the teacher may conduct what appears to be a pleasant exercise with such material, but there is little real value in it under the best circumstances and it should be avoided systematically. It is unskilful, and a waste of time and opportunity.

Attempts to lower one's conversation to the level of little children are often equally unsatisfactory. Too much use of "Mamma bird," "baby birdies," "clothes," "sweet," "lovely," "tootsy-wootsy," and "Oh, my!" is disappointing.

Ordinary conversation opened with a class in much the same style and language as used by one adult in talking with another is found to be the most profitable. Introductory remarks are generally bad, though some otherwise excellent teachers do run on interminably with them. To begin directly with a common-sense statement of real interest is best.

Here are a few profitable opening statements for different exercises: One day I found a dead mouse hanging upon a thorn in a field. Mr. Smith told me he heard a Flicker say, "Wake up! Wake up! Wake up!" Willie says his bird is fond of fruit, and I notice that most birds that eat fruit have beautiful, bright feathers. This bird likes the cows, and I once saw him light on a cow's horn.

Such statements open the minds of

young people where many times direct questions close them. Questions and regular contributions to the conversation flow readily from members of the class when the right opening has been made. Do not let the class feel that your purpose is to get language from them. Mere talk does not educate. Animated expression alone is valuable.

Have plenty of material to use if the class seem slow to respond, and have patience when they have more to offer than the time will admit. Bear in mind that a conversation lesson on some nature subject is not a nature lesson, but is given to induce correct thinking, which shall come out in good language. It may incidentally be such a nature lesson as to satisfy the requirements of your course of study in that line, but if you give it as a conversation lesson, let conversation be the exercise.

Where a few in the class tend to monopolize the time you may frequently bring a diffident one into the exercise by casually looking at him as if you felt his right to be heard. It is better not to ask him to talk, but to make it easy for him to come into the conversation by referring to something he has previously done or said, or by going near him while others talk. A hand on his shoulder while you are conversing with others, will sometimes open him to expression. Sometimes you need to refer to what Willie's father said, or what you saw at his house, or to something that Willie owns and is pleased with. Many expedients should be tried and some time consumed in endeavoring to get such a pupil into the conversation instead of saying point blank, "Now, Willie, what do you think?"

The matter of spoken language is words largely. The thinking of children is always done in words, as far as school matters go. The thoughts of

the average child are correct enough from his standpoint, and when the teacher represses him on his first attempt to carry his part in the exercise, he is hurt to such an extent that he may never recover from it, and he may always believe himself peculiarly unfortunate in that he is incapable of speaking as others do.

The truth is that all children are eloquent. They talk easily, very easily, in comparison with adults who have been frightened out of their natural tongues, and are forever trying to say what they think in terms that they do not think it in.

All children are sensitive concerning their speech. Some of the keenest hurts children experience are inflicted by those who notice patronizingly or critically the language they use. Mothers are in a hurry to have them learn English at once, and so correct them instantly when such mistakes as "runned," "mouses," and "me wants" occur. The child allowed to think in his own terms overcomes his verbal difficulties in a short time if associated at home with those who speak correctly, and he is perfectly excusable for using what we call incorrect forms until he has acquired the so-called correct ones.

There are times when the child's mind is open to acquisition of formal expertness in language. He will find these times for himself and exercise himself in forms without being driven to it at the very times when his mind is most active with other things which he tries to express to us in his moments of overflowing enthusiasm. In these moments he should not be bothered and confused by formal quibbling. In his most active states intellectually he ought not to be repressed. This applies to the child who hears good English at home. It also applies, with slight modifications, to the child who hears

imperfect language at home. The child who will eventually prove capable of correct speech will learn to speak the best language he hears without direct instruction if encouraged in it and given the respect a growing child is entitled to receive.

Children learn to speak while at play. They are active and much interested when they are acquiring a natural vocabulary. Much of the vocabulary is wrong from the standpoint of the grammar and dictionary, and they have to unlearn it. They have to unlearn it at school and from the lips of pains-taking parents. One reason it is so hard for them to learn the correct forms is this unintelligent way of teaching. Another is that the incorrect conversation is heard under circumstances favorable to retention and reproduction; that is, when the child is much interested and happy; while the correct forms are given him when he is but half aroused, or when he is somewhat intense over another matter, and many times the intended instruction goes in at one ear and out at the other. When the skill of the teacher and the things of the school room become so powerfully attractive to the pupil that once hearing a new word will fix it, once seeing a word will make him master of it in all its forms, then the language lesson will not need to be given; for language, which is as natural to man as breathing, will flow in correct forms trippingly from the tongue, being so fixed in the pupil's mind from the first that he will have nothing to unlearn.

Conversation lessons are intended to take care of some of the crudest errors in speech before the child has committed the indiscretion of putting them in writing. It can be done with so much less severity in conversation than in a written lesson. Notice

silently the peculiarly bad expressions and forms of statements of the whole class, then plan your talking lesson in which those who are not guilty of those errors are allowed to lead. Then let the child whom you consider most likely to profit by hearing correct expression from his mates give you the necessary statement. If he use correct forms, let another try.

For instance, suppose you have a number of pupils who are inclined to say "The robin isn't so purty as the bluejay." The reason for this is that the parents of nearly all these pupils will make the same error. If early in their experience with you you are shocked by their speech and let them know it, you either lose their respect or make them feel that they and their parents are inferior beings with no right to speak.

It will take a few minutes to speak of something else that is pretty, and let several of your pupils who speak the word correctly give some statements concerning pretty things. Then call upon one of the offenders, without his suspecting himself to be such, and the probability is that he will say "pretty," as you wish. But suppose he fail, you must not think he does so because of dullness, for he may say "purty" for the sole reason that his mates are listening and he fears they may think he is trying to "put on style." If you pass the matter in silence that day you will find him bolder or more acute the next day, and he will speak the word correctly. In this way he will seem to himself to be teaching himself. Self-culture will begin in him and the credit will be yours. Another teacher would suppress that sort of language and compel the boy to say the word right instanter. But her pupils speak one language in school and a different one in places where they are more comfortable.

Aim to set the child to correcting his own speech by his own apparent choice. A single error is easily repressed, but the habit of looking after one's own speech is not easily acquired. It is easy to make a child feel his inferiority to you, but it is a great thing to inspire him to do the good and wise and elegant things which you are capable of doing in his presence.

The process of unlearning words has always been a failure with the majority of pupils, and most of the English speaking race are ashamed of their inability to speak. Men most eloquent and successful in business conversation, who were by nature fitted to thrill the world with tongue and pen, have been confused and repressed by this process till they believe themselves vastly inferior to others because they cannot translate their thoughts out of the terms of the street or counting room into the language of the grammar school, and so they never try to fill the large places that would have been open to them if they could but have learned to think in terms which may be spoken right out without fear of opprobrium.

Now since so much of our teaching psychology and common sense have shown to be radically wrong, let us build up our language work on the high plane of interest in real things, expressing thought directly without translation into fitter terms. Let the thinking be done in terms suitable for life. And use the color photograph to insure that enthusiasm necessary to good thinking; be guarded as to how you deal with thoughts that come hot from growing minds, repress never, advise kindly, and know that by following the natural method in language you are not ruining the speech powers of your best pupils, as has been done heretofore.

SUMMARY.

Page 166.

SHARP-TAILED GROUSE—*Pediocætes phasianellus campestris*. Other names: Sprig-Tail, Pin-Tail, White Belly.

RANGE—Plains and prairies east of the Rocky Mountains; east to Wisconsin, north to Manitoba, south to New Mexico.

NEST—In a tuft of grass or under a low bush.

EGGS—Six to thirteen.

Page 170.

RED BAT—*Atalapha noveboracensis*. Other name: "New York Bat."

RANGE—Throughout all the Atlantic coast states.

Page 170.

BLACK BAT—*Scotophilus carolinensis*. Other name: "Carolina Bat."

RANGE—Common throughout North America.

Page 174.

AMERICAN OTTER—*Lutra canadensis*.

RANGE—All parts of temperate North America, encroaching closely on the Arctic region.

Page 178.

GOLDEN PLOVER—*Charadrius dominicus*. Other names: Frost Bird, Bull Head.

RANGE—Nearly the whole of North America, breeding in the Arctic regions; south in winter to Patagonia.

NEST—In a small depression among the moss and dried grass of a small knoll.

EGGS—Four, of a pale yellowish ground color, with dark umber-brown spots scattered over the shell.

Page 187.

CANADIAN PORCUPINE—*Erethizon dorsatus*.

RANGE—A native of the forests of North America, from the sixty-seventh parallel of north latitude south to Virginia and Kentucky, the eastern and western boundaries being Labrador and the Rocky Mountains.

Page 191.

CASPIAN TERN—*Sterna tschograva*.

RANGE—Nearly cosmopolitan; in North America, breeding southward to Virginia, Lake Michigan, Texas, Nevada, and California.

NEST—A mere hollow scooped in the dry sand.

EGGS—Two or three, varying from white to greenish-buff, spotted with brown and lilac of different shades.

Page 195.

FLOWERING ALMOND—*Amygdalus communis*. Native of Calmuck, Tartary.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. IV.

DECEMBER, 1898.

No. 6

VOICES.

W. E. WATT.

ALL animals with lungs have some sort of contrivance in the windpipe that is able to set the air in vibration as it is expelled or inhaled. Some have not only this means of making vocal sound, but have also power to vary the quality and intensity of it. Out of this second ability come speech and song.

Ants converse with their antennæ, having no lungs nor windpipe. Bees do the same. Those of her attendants who first perceive the absence of the queen from the hive apply their antennæ to the feelers of their companions. The ensuing excitement settles the question as to their ability to talk. This shows that while voice is the usual organ of language there is yet a good deal of conversation going on about us that is not expressed in words, just as there is much music performed by insect orchestras with no vocal contributions.

Hares and Rabbits never use their voices except when suffering intensely. When caught by an enemy or wounded in the chase they utter the only cry that ever escapes from their throats. Spasmodic agitation of the chest muscles and the larynx gives forth the sound. Such unintentional utterances are frequent in other animals that use their voices freely when nothing has injured them, as the death shrieks of cattle and the screams of horses attacked by wolves.

It is of little use to ask why animals are equipped with voices, for the fact is an animal could hardly be constructed with lungs and apparatus for controlling

ingress and egress of air without the controlling organ's being more or less noisy or even musical. Snorts, snores, whistles, purrs, groans, and trumpetings follow naturally where the bellows and pipe are active.

Although Darwin considers that the habit of uttering musical sounds was first acquired for courtship, and that in man it was early associated only with his strongest emotions, such as love, rivalry, and triumph, the writer holds the opinion that both significant and musical utterance originated not in any desire to move others, but was cultivated solely for the pleasure it gave the one who made it.

If primitive man did not receive language ready-made at creation, but developed it as the philologists claim, it was a gradual acquisition. While our early ancestor dug in the ground he emitted certain sounds, as he pursued he uttered others, and as he devoured he indulged in a different grunt or exclamation. When he wished to call the attention of others to one of these acts he merely reproduced the sound that went naturally with it. And so *clamor concomitans* became *clamor significans*. But the sound as it came forth at first had no meaning and no design. The man made the sound rather instinctively than mentally and he enjoyed making sounds as much as a baby now enjoys crowing or a youngster delights in yelling when he has no ideas he cares to convey. Much of the singing of birds is done merely because the birds wish to please themselves with the sounds peculiar to

themselves. They are, as a rule, in no wise trying to charm their mates, and they are not at all desirous of pleasing anyone but themselves. It would be as reasonable to claim that the carpenter on the roof is whistling to please his sweetheart or that the lumberman alone with his cattle in the forest trolls forth his jolly song for any amorous reason. There are times when these purposes are the cause of singing, but the fact is that the great majority of the singing and whistling done by men, birds, and beasts sounds far better to the ones that produce it than to any other. In fact, society itself would be in a far better state if the men and women who sing would only acknowledge that they are doing so mainly to please themselves, and they might then be persuaded in part to leave off trying to surprise their hearers at times by singing louder or higher or faster than nature intended they should do. Most people enjoy listening to song, but no one can appreciate the beauties of it so well as the artistic singer who has acquired his talents by assiduous and intelligent discipline. His enjoyment of his own efforts is as much higher than that of his auditors as is the pleasure of the man who sings out of tune above the felicity of his hearers.

Elephants speak in three ways. Pleasure is evinced by blowing the proboscis in a sharp manner—like the sound of a trumpeter learning. Wants are murmured over in the mouth. Rage roars tremendously low in the throat. While these sounds are not made for the purpose of informing others of states of feeling, yet they do convey to man and beast an idea of what is going on. So the lower animals accidentally, if you please, have a sort of language. It is instinctive and conveys no intelligence not immediately connected with the present state of the speaker or his community.

Marcgrave says he has frequently seen the meetings held by the Ouarine Monkeys and enjoyed their deliberations. "Every day they assemble in the woods to receive instructions. One takes the highest place on the tree and makes a signal with his hand for

the rest to sit round. As soon as he sees them placed he begins his discourse in a loud and precipitate voice; the rest preserve a profound silence. When he has done he makes a sign with his hand for the rest to reply. At that instant they raise their voices together, until by another signal silence is enjoined."

Professor Garner has studied simian speech so carefully that he is able to converse with Monkeys to a limited extent. He says they have words for "food" and "drink," have a spoken salutation, and can distinguish numbers up to about three, and have some notion of music. "In brief, they appear to have at least the raw material out of which are made the most exalted attributes of man."

Aristotle noticed that voices vary with conditions when he gravely announced that the Calf affords the only instance in nature where the voice of the young is deeper and graver than that of its parent. Wild animals frequently change their voices on domestication. Domestic Dogs and even tame Jackals have learned to bark, which is a noise not proper to any species of the genus, with the possible exception of the *Canis latrans* of North America. Columbus discovered that Dogs left by him on an island where there was no game nor any other occasion for barking lost their voices completely before he visited them on a subsequent voyage. Some breeds of domestic Pigeons coo in a new and quite peculiar manner not manifested in their wild state.

The same species of birds living in different localities sometimes have different vocal habits. An excellent observer says an Irish covey of Partridges spring without uttering a call, while, on the opposite coast, the Scotch covey accompany their springing with intense shrieks. Bechstein says that from many years of experience he is certain that in the Nightingale a tendency to sing in the middle of the night or in the day runs in families and is strictly inherited.

As the Parrot acquires human language by association with unfeathered bipeds, so do many voices modify themselves as circumstances alter, and

the particular sound which one day may accompany and express fright or anger may be laid aside for another more suitable to new conditions, much as a man uses different sounds in asking for butter at a French restaurant and in a German inn. And while it is probably not true that speech was given for the purposes of communicating with others, it has occurred in nature that speech has become the principal means of transmitting ideas.

An old Goose had her nest in the kitchen of a farmer. She had been endeavoring for a fortnight to hatch some eggs, but was taken ill rather suddenly and found she could not finish the task. With evident agony she repaired to an outhouse where was a Goose of but one year's growth. In some way she told the young sister that her valuable mission was about to be interrupted ere its fulfillment and implored her to become her successor. So complete was the communication between them that the young one entered the kitchen and took her place with evident maternal pride, remaining there till the eggs were hatched and afterwards caring assiduously for the welfare of the Goslings. The old Goose expired contentedly before incubation was complete.

A gentleman who visited London occasionally was usually accompanied by a small Dog. Nearing the city, he put up at an inn and left the Terrier there to await his return. Once, as he came back from London, the Dog was not there. He had had a fight with a large Housedog and been so badly wounded that it was thought he would not recover. But after lying quietly for a couple of days he disappeared. About a week later he returned with a larger animal, sought his adversary, and by union of efforts gave him a terrible punishment. It was found that his coadjutor was a neighbor, and that the wounded animal must have traveled long to visit his friend, had been able to tell him of his sorrows, awaken his sympathies, and keep him enlisted in his cause all the while they were on their way to seek their enemy, and was no doubt able to congratulate his partner many times during the homeward

journey on the success of their valorous enterprise.

Professor Morgan says: "I find that the sounds emitted by young Chicks are decidedly instinctive—that is to say, they are inherited modes of giving expression to certain emotional states. And some of them are fairly differentiated. At least six may be distinguished: First, the gentle, piping sound expressive of contentment—for example, when one takes the little bird in one's hand. A further low note, a sort of double sound, seems to be associated with extreme pleasure, as when one strokes the Chick's back. Very characteristic and distinct is the danger note. This is heard on the second or third day. If a large Humble-bee, or a black Beetle, or a big lump of sugar, or in fact anything largish and strange, be thrown to them this danger note is at once heard. Then there is the piping sound, expressive apparently of wanting something. It generally ceases when one goes near them and throws some grain, or even only stands near them. My Chicks were accustomed to my presence in the room, and generally were restless, and continuously made this sound when I left them. Then there is the sharp squeak when one seizes a Chick against its inclination. Lastly there is the shrill cry of distress, when, for example, one of them is separated from the rest. I have very little doubt that all of these sounds have a suggestive value of emotional import for the other Chicks. Certainly the danger-note at once places others on the alert, and the pleasure-note will cause others to come to the spot where the little bird is when the note is sounded."

A good story is told by H. B. Medlicott to show what ideas wild pigs can express in sounds. "In the early dawn of a gray morning I was geologizing along the base of the Muhair hills in South Behar, when all of a sudden there was a stampede of many Pigs from the fringe of a jungle, with porcine shrieks of *sauve-qui-peut* significance. After a short run in the open they took to the jungle again, and in a few minutes there was another uproar, but different in sound and in action;

there was a rush, presumably of the fighting members, to the spot where the row began, and after some seconds a large Leopard sprang from the midst of the scuffle. In a few bounds he was in the open, and stood looking back, licking his chaps. The Pigs did not break cover, but continued on their way. They were returning to their lair after a night's feeding in the plain, several families having combined for mutual protection; while the beasts of prey were evidently waiting for the occasion. I was alone, and though armed, I did not care to beat up the ground to see if in either case a kill had been effected. The numerous herd covered a considerable space, and the scrub was thick. The prompt concerted action must in each case have been started by a special cry. I imagine that the first assailant was a Tiger, and the case was at once known to be hopeless, the cry prompting instant flight, while in the second case the cry was for defense. It can scarcely be doubted that in the first case each adult Pig had a vision of a Tiger, and the second of a Leopard or some minor foe."

The structure of throats that talk and sing varies greatly, and scientists have yet much to learn about the adaptations of forms to purposes. Agassiz gives the following clear description of the throats of birds: "The proper larynx is very simple, destitute of vocal chords, and incapable of producing sounds; but at the lower end of the windpipe there is a second or inferior larynx, which is very complicated in structure. It is a kind of bony drum, having within it two glottides, formed at the top of the two branches of the windpipe, each provided with two vocal chords. The different pieces of this apparatus are moved by peculiar muscles, the number of which varies in different families. In birds which have a very monotonous cry, such as the Gulls, the Herons, the Cuckoos, and the Mergansers, there is but one or two pairs; Parrots have three; and birds of song have five." But there are still further items regarding special uses that make the question hard to solve.

Some throats that have apparently the same structure as far as the scalpel

and microscope can distinguish have marvelously different powers of delivery. MacGillivray has pointed out that the Rook and the Hooded Crow seem to have just as complex an apparatus for their sepulchral utterances as the Nightingale and the Blackbird. But where loudness of sound is required without regard to range and quality there are some notable conformations, as in the Whooping Crane and the Howling Monkey. This Monkey has large cavities communicating with the glottis, and the air reverberates as it passes the larynx so the most deafening noises are produced.

Birds sing and other animals yell, roar, and snort, not for love-making purposes, but rather because of the joy of life that is in these creatures, and it manifests itself in this way as well as in the gambols of the Lambkin or the antics of the Monkey. The voice of the Mule is the sweetest sound in the world—to some other Mule. But it is sweeter still to the Mule that makes the joyful sound. Placzeck notes that a bird frequently sings lustily when he knows himself to be entirely alone. "In the spring-time of love, when all life is invigorated, and the effort to win a mate by ardent wooing is crowned with the joy of triumph, the song reaches its highest perfection. But the male bird also sings to entertain his mate during the arduous nest-building and hatching, to cheer the young and, if he be a domesticated bird, to give pleasure to his lord and the Providence that takes care of him, and in doing so to please himself. Lastly, the bird sings—by habit, as we call it—because the tendency is innate in the organs of song to exercise themselves." In other words, animals have the apparatus for making noises provided them in their organs of breathing, and because they have them they use them and are delighted with them, each in his own kind. Finding them a source of joy unto themselves it is not to be wondered at that they employ their voices in their love-making because they feel that what pleases themselves so much must not be without effect upon their loved ones.



THE AFRICAN LION.

Amid the far-off hills,
With eye of fire, and shaggy mane upreared.
The sleeping Lion in his den sprang up;
Listened awhile—then laid his monstrous mouth
Close to the floor, and breathed hot roarings out
In fierce reply.

—EDWIN ATHERSTONE. (1821)

THE common opinion of the Lion from the remotest times is that he is King of Beasts, and a single glance at his face of majesty is sufficient to make us accept it. His roar is terrific, and the fact is well known that all animals tremble at the mere sound of his voice. The effect of it on his subjects is said to be indescribable. "The howling Hyena is stricken dumb, though not for long; the Leopard ceases to grunt; the Monkeys utter a loud, gurgling sound and mount to the highest tree-tops; the Antelopes rush through the bushes in a mad flight; a bleating flock becomes silent; the laden Camel trembles and listens no longer to his driver's appeal, but throws load and rider off and seeks salvation in flight; the Horse rears, snorts, and rushes back; the Dog, unused to the chase, creeps up to his master with a wail." But it is said we must not think that the Lion lets his roar re-echo through the wilderness at all times. His usual sounds are a deep growl and a long-drawn tone, like the mewing of a giant Cat. His real roar is uttered comparatively seldom, and many people who have visited countries inhabited by Lions have never heard it. It is the only one of its kind, and is surpassed in fullness of tone by the voice of no living creature except the male Hippopotamus, according to Pechnel-Loesche. "The Arabs have a pertinent expression for it: '*raad*,' meaning thunder. It seems to come from the very depth of the chest and to strain it to the utmost."

This Lion is distributed all over Central and Southern Africa. They are regularly met with on the banks of the Blue and White Nile, and in the deserts of central and Southern Africa they are of common occurrence.

The Lion leads a solitary life, living with his mate only during the breeding

season. Selous says that in South Africa one more frequently meets four or five Lions together than single specimens, and troops of ten or twelve are not extraordinary. His experience taught him that the South African Lion prefers feasting off the game some hunter has killed to exerting himself to capture his own prey. This is why he regularly follows nomadic tribes wherever they go; he regards them as his tributary subjects and the taxes he levies on them are indeed of the heaviest kind.

The Cubs are usually two or three and the Lioness treats them with great tenderness. They play together like Kittens. In well-managed zoological gardens Lions are now bred as carefully as Dogs; and even in circuses, where the animals have but little room and often insufficient nourishment, they are born and sometimes grow up. The cubs are at first rather clumsy. They are born with their eyes open and are about half the size of a Cat. Towards the close of the first year they are about the size of a strong Dog. In the third year the mane begins to appear on the male, but full growth and distinction of sex, according to Brehm, are only completed in the sixth or seventh year. Lions in captivity have lived to be seventy years old.

Brehm, who loved the Lion and was probably better acquainted with his habits than any other traveler, says: "The most prominent naturalists give the Lion credit for qualities which in my opinion include nobility enough. And whoever has become more closely acquainted with that animal; whoever has, like myself, intimately known a captive Lion for years, must think as I do; he must love and esteem it as much as a human being can love and esteem any animal."

A SYMBOL.

BY IRWIN RUSSELL.*

Over the meadow there stretched a lane,
Parting the meadow in segments twain;
And through the meadow and over the sod
Where countless feet had before him trod—
With a wall forever on either hand
Barring the lane from the meadow-land,
There walked a man with a weary face,
Treading the lane at a steadfast pace.

On before him, until the eye
To gauge the distance could no more try,
To where the meadow embraced the sky,
The lane still stretched, and the walls still barred
The dusty lane from the meadow sward.
He paid no heed to the joyous calls
That came from men who had leaped the walls—
Who paused a moment in song or jest,
To hail him "Brother, come here and rest!"
For the Sun was marching toward the West,
And the man had many a mile to go,
And time is swift and toil is slow.

The grassy meadows were green and fair
Bestudded with many a blossom rare,
And the lane was dusty, and dry, and bare;
But even there, in a tiny shade
A jutting stone in the wall had made,
A tuft of clover had lately sprung—
It had not bloomed for it yet was young—
The spot of green caught the traveler's eye,
And he plucked a sprig, as he passed by;
And then, as he held it, there came a thought
In his musing mind, with a meaning fraught
With other meanings.

"Ah, look!" said he,
"The spray is one—and its leaves are three,
A symbol of man, it seems to me,
As he was, as he is, and as he will be!
One of the leaves points back, the way
That I have wearily walked to-day;
One points forward as if to show
The long, hard journey I've yet to go;
And the third one points to the ground below.
Time is one, and Time is three:
And the sign of Time, in its Trinity—
Past, Present, Future, together bound
In the simplest grass of the field is found!
The lane of life is a dreary lane
Whose course is over a flowery plain.
Who leaps the walls to enjoy the flowers
Forever loses the wasted hours.
The lane is long, and the lane is bare,
'Tis tiresome ever to journey there;
But on forever the soul must wend—
And who can tell where the lane will end?"

The thought was given. Its mission done,
The grass was cast to the dust and sun;
And the sun shone on it, and saw it die
With *all three leaves* turned toward the sky.

* Died in 1878. The Century Co. published a small volume of his poems a few years ago. This poem has never before been printed.—ED.



THE CACTUS.

PROF. W. K. HIGLEY.

BECAUSE the Greeks in olden times applied the word Cactus to a prickly plant, Linnæus, often called the Father of Botany, gave the same name to our wonderful American growth and since his time these strange and varied plants have borne this nomenclature.

We can hardly imagine any group of plants more interesting. There are over eight hundred varieties of curious and unexpected forms, bearing tubular or rotate flowers most varied in size and color—white, pink, purple, yellow, crimson, deep red—all beautiful and fascinating, and in our Northern country, protected in the conservatories. The Night-blooming *Cereus* is most renowned, most admired of all.

The Cacti are commonly found in the United States, in Mexico, and in South America, and some species are cultivated on the borders of the Mediterranean Sea, where the fruit is eaten.

They vary in size from an inch or two in height to enormous growths of fifty or sixty feet (*Cereus giganteus*) which stand like telegraph poles, sometimes nearly bare, sometimes with many vertical branches, reminding one of a huge candelabrum. Then again some forms are nearly spherical, while others are long, jointed, and square, one species (*Echinocactus visnaga*) grows about nine feet in height with a diameter of three feet or more and a single plant of this species will sometimes weigh a ton. One of our most common forms is flat and broad; This, the Prickly Pear or Indian Fig (*Opuntia Vulgaris*), is the only species found as far north as Wisconsin and New York.

As many of the Cacti require but little care, they are quite extensively cultivated, not only for the rare beauty of their flowers, but for economic purposes. However, nearly all are worthy of culture because of their peculiar forms.

In structure they are fitted for growth in the most arid regions; they abound in the deserts of New Mexico and southward, in many cases obtaining their food from a soil in which no other

plant will grow, their thick coats enabling them to retain moisture and vitality for many weeks. Specimens of the Prickly Pear have been known to grow after lying on a dry floor, in a closed room, for six months and they have blossomed when left in this condition for some time.

These plants, which are more or less succulent, are usually protected from the ravages of animal life by a formidable array of spines and prickles. Those who have carelessly handled our common Prickly Pear can attest to the intensely irritating character of its defensive armor. Thus does nature provide for the care of its otherwise defenseless forms.

A form of the Prickly Pear (*Opuntia coccinellifera*) is cultivated in Mexico for the purpose of raising the Cochineal insect (*Coccus cacti*) which feeds upon it. Some of these plantations contain as many as 50,000 plants. The females are placed on the Cactus in August and in about four or five months the first gathering of the Cochineal takes place, being then ready for the market.

There are many other interesting uses to which these plants are put. When suffering from thirst animals will tear off the hard outer fibers and eagerly devour the moist, juicy interior of the stems. The Moki Indian basket makers use the fiber in their work. This they dye different colors and wind around the foundations, giving strength and beauty. The spines of one species (*Echinocactus visnaga*) are used by the Mexicans as toothpicks. It has been estimated that a single plant may bear upwards of 50,000 spines.

A unique and beautiful sight was a group of Cacti blooming in a Colorado garden, where the owner had spent much time and expense in gathering together many varieties, and one was made to realize how remarkable a thing Nature had lavished upon us; for, as Mr. Grant Allen has said: "The Cactuses are all true American citizens by birth and training, and none of them are found truly indigenous in any part of the Old World."

MYTHS AND THE MISTLETOE.

On Christmas Eve the bells were rung;
On Christmas Eve the chant was sung;
That only night in all the year
Saw the stoled priest the chalice near;
The damsel donned her kirtle sheen;
The hall was dressed with Holly green;
Forth to the woods did merry men go
To gather in the Mistletoe.

THE Mistletoe, particularly that which grows on the Oak, was held in great veneration by the Britons. At the beginning of their year the Druids went in solemn procession into the forests, and raised a grass altar at the foot of the finest Oak, on which they inscribed the names of those gods which were considered the most powerful. After this the chief Druid, clad in a white garment, ascended the tree and cropped the Mistletoe with a consecrated golden pruning-hook, the other Druids receiving it in a pure, white cloth, which they held beneath the tree. The Mistletoe was then dipped in the water by the principal Druid and distributed among the people as a preservative against witchcraft and disease. If any part touched the ground it was considered an omen of some dreadful misfortune.

In the Eddas of mythological Norse lore, Loke, the evil spirit, is said to have made the arrow with which he wounded Balder (Apollo), the son of Friga (Venus), of a branch of Mistletoe. Balder was charmed against everything which sprang from fire, earth, air, and water, but the Mistletoe, springing from neither of these, was fatal, and Balder was not restored to the world till by a general effort of the other gods. In some parts of Germany and

Switzerland it is believed that by holding in the hand a branch of Mistletoe one will be enabled not only to see, but to converse with departed spirits.

The Druids, partly because the Mistletoe was supposed to grow only on the Apple tree and the Oak, and also on account of the usefulness of the fruit, paid great attention to its cultivation. Many old rites and ceremonies, in connection with the Apple, are practiced to this day in some parts of England. On Christmas Eve the farmers and their men take a huge bowl of cider, with a smoking piece of toasted bread in it and, carrying it to the orchard, salute the Apple trees with great ceremony, in order to make them bear well next season.

The wassail bowl drank on Christmas Eve, and on other church festivals, was compounded of old ale, sugar, nutmegs, and roasted apples, of which each person partook, taking out an apple with a spoon and then a deep draught out of the bowl.

Under the Mistletoe of Christmas, the custom of kissing has been handed down to us by our Saxon ancestors, who, on the restoration of Apollo, dedicated the plant to Venus, the Goddess of Love and Beauty. It was placed entirely under her control, thus preventing its ever again being used against her in future ages.—*E. K. M.*



From col. Chi. Acad. Sciences.

FLYING SQUIRREL.
 $\frac{1}{2}$ Life-size.

Copyright 1898,
Nature Study Pub. Co., Chicago.

THE FLYING-SQUIRREL.

WITH the exception of Australia, Squirrels are found in all parts of the globe; they extend tolerably far north and are found in the hottest parts of the South. As a family they are lively, quick, and nimble in their movements, both in trees and upon the ground, Flying Squirrels alone being ill at ease when upon the surface of the earth. In compensation for this, however, they are possessed of a faculty which enables them to make exceedingly long leaps, which they take in an obliquely descending direction.

The nocturnal Flying Squirrels, says Brehm, differ from the diurnal Tree Squirrels mainly in having their fore and hind legs connected by a wide flying-membrane. This membrane acts as a parachute, and enables them to execute considerable leaps with ease, in an inclined plane from above downwards. This membrane consists of a stout skin, extending along both sides of the body, thickly grown with hair on the upper side, while the lower one shows but a scanty covering. A bony spur at the first joint of the fore-legs gives especial strength to the membrane. The tail serves as an effective rudder and is always vigorous, though it is not of the same conformation in the different species, one group having it simply bushy, while the other has the hair on it arranged in two lateral rows. There are also slight differences in the structure of the teeth.

The Flying Squirrel of North America, Assapan, is next to the smallest variety of the whole species, the Jaguan, or East Indian, being the largest, nearly equaling a cat in size.

The fur of the North American Flying Squirrels is exceedingly soft and delicate. In captivity they suffer themselves, by day, to be gently handled, making no effort to bite with their little sharp teeth as other Squirrels do. Overcome with sleep they lie curled up in their cage, as much hidden from

view as possible, rarely bestirring themselves before nine o'clock at night. Then, "on the upper edge of the sleeping-box, which one must give them as a substitute for their nest, a round little head becomes visible; the body follows and soon one of the little creatures sits on the narrow edge of the box in a graceful Squirrel-like attitude, the flying membrane half folded against its body, half hanging down in a soft curve. The small, expanded ears move back and forth as does the bewhiskered muzzle, and the large, dark eyes inquisitively scan the cage and surroundings. If nothing suspicious is visible, the Assapan glides down like a shadow, always head first, whether the plane be inclined or vertical, without any noise, without a perceptible movement of the limbs, the greater part of which is covered with the membrane. It proceeds on the woven ceiling of the cage, back downward, as if it walked on level ground; it rope-dances over thin twigs with unsurpassed precision and agility at a uniform speed; spreading its membrane to the full, it darts through the whole space of the cage like an arrow, and the next instant seems glued to the perch, without having made an effort to regain its balance.

During all this moving about it picks up a crumb, a nut, a grain of meat from its dish; drinks, sipping more than it laps, washes its head with saliva, combs its hair with the nails of its fore-feet, smooths it with the soles of its small paws, turning, stretching, stooping all the while, as if its skin were a bag in which its body sits quite loosely.

After hunger and thirst are somewhat appeased, and the toilet over, a playful humor succeeds. Up and down, head upward or inverted, along the ceiling, or the floor, running, jumping, gliding, soaring, hanging, sitting, rushing ahead as if it could move a thousand joints at once, as if there were no such thing as gravity to be overcome."

HUMMING-BIRDS.

IF these exquisite little creatures are called Humming-birds, you little folk may ask, why wasn't the Bee called a Buzzard because it buzzes?

Well, really, that is a question which I will not attempt to answer, but the fact remains that no other name would have been so appropriate for these jewel-like birds but the one above, on account of the humming sound which they produce when hovering in their curious fashion over a tempting blossom, and feeding on its contents while suspended in air.

There are four hundred and sixty-seven species of these little birds, and no two of them, 'tis said, make precisely the same sound, one producing a noise exactly like the whizzing of a wheel driven by machinery, while that of another is very like the droning hum of a large Bee. But no two voices in even one human family, you know, are alike, so it is not amazing that the rule holds good among the birds.

You can capture and tame these lovely little creatures, too, though I wouldn't advise you to keep them in a cage very long. They will pine away and look very doleful if you do.

Rather, after you have accustomed them to your presence, and fed them regularly upon the honey and syrup and other sweets which they dearly love, open the cage door and give them their liberty. A gentleman once did this and was delighted to see them return to their old quarters in a very little while. By watching them the next morning after setting them free again, he found they had been pining for a nice fresh garden Spider which they had been accustomed to daintily pick from the center of his web. He had provided them with Spiders and Flies, but they wanted to flit about and search for themselves. For dessert they liked the sweets which he gave them, so back they went to their cage, instead of extracting it from the flowers with their long bills, as they were wont to do.

A Humming-bird one summer built its nest in a butternut tree very near a lady's window. She could look right down into its nest, and one day, as it began to rain, she saw the mother-bird take one or two large leaves from a tree near by and cover her little birdlings with it. She understood how to make an umbrella, didn't she?

HUMMING-BIRDS.

"Minutest of the feathered kind,
Possessing every charm combined,
Nature, in forming thee, designed
That thou shouldst be

"A proof within how little space
She can comprise such perfect grace,
Rendering thy lovely fairy race
Beauty's epitome."

IT has been said that what a beautiful sonnet is to the mind, one of these fairy-like creations is to the eyes.

This is true even in the case of mounted specimens, which must necessarily have lost some of their iridescence. Few can hope to see many of them alive. The gorgeous little birds are largely tropical, the northern limit of their abundance as species being the Tropic of Cancer. They are partial to mountainous regions, where there is diversity of surface and soil sufficient to meet their needs within a small area. The highlands of the Andes in South America are the regions most favored by a large number of species. They are most abundant in Ecuador, the mountain heights affording a home for more than one hundred species. Columbia has about one hundred species; Bolivia and Peru claim about ninety-six; then follow, in consecutive order, Central America, Brazil, Venezuela, Mexico, Guiana, the West Indies, and the United States.

The eastern part of the United States has but one representative of the Humming-bird family, and only seventeen species have been found within the limits of the country. As ten of these really belong to the Mexican group, we can claim ownership of only seven, most of which, however, migrate far south in winter. Only one of these, the Anna, spends the winter in the warm valleys of California.

Most of the Hummers are honey-lovers, and they extract the sweetest juices of the flowers.

The "soft susurrations" of their wings, as they poise above the flowers, inserting their long beaks into tubes of nectar, announce their presence. Some of the Warblers and Kinglets will sometimes poise in this way before a

leaf and peck an insect from its surface, but it is not a regular habit with them. The Hummer's ability to move backwards while on the wing is one of the most wonderful features of its flight, and this movement, Mr. Ridgway says, is greatly assisted by a forward flirt of the bird's expanded tail.

The nests of the Humming-birds are of cup-shape and turban-shape, are composed chiefly of plant-down, interwoven and bound together with Spider webs, and decorated with lichens and mosses. Usually the nest is saddled upon a horizontal or slanting branch or twig, but that of the Hermit Hummer is fastened to the sides of long, pointed leaves, where they are safe from Monkeys and other predaceous animals.

"Dwelling in the snowy regions of the Andes are the little gems called Hill-stars," says Leander S. Keyser, "which build a structure as large as a man's head, at the top of which there is a small, cup-shaped depression. In these dainty structures the eggs are laid, lying like gems in the bottom of the cups, and here the little ones are hatched. Some of them look more like bugs than birds when they first come from the shell. The method of feeding the young is mostly by regurgitation; at least such is the habit of the Ruby-throat, and no doubt many others of the family follow the fashions of the Humming-bird land. The process is as follows: The parent bird thrusts her long bill far down into the throat of her bantling, and then, by a series of forward plunges that are really terrible to witness, the honey food is pumped from the old bird's craw into that of the youngster. So far as is known the babies enjoy this vigorous exercise and suffer no serious consequences from it."

CHRISTMAS TREES.

FRED. A. WATT.

OUR Christmas tree is a relic of the old heathen times and came down to us as a part of the Yule festival. It seems to have originated in Germany and can be traced back as far as the year 1604 with certainty, and as it was an established custom at that time it is evidently much older.

How the early man conceived the idea is open to dispute, but in my opinion it is due to an old superstition which has some believers even to this day. It is said that any maid who is not kissed under the Mistletoe at Christmas will not be married during the year following. I have no doubt that the anxiety of the young ladies to be always found under the Mistletoe on that day has led to the profuse green decorations, from which it is only a step to the Christmas tree.

It was introduced into the Court of St. James in 1840 by Prince Consort Albert of Saxe-Cobourg, and the custom spread rapidly through the aristocratic families of London and was almost immediately adopted by all classes throughout England.

It was introduced into the court at Paris in 1830 by the Duchess of Orleans and is now a French custom.

It seems, however, that in our own country it has taken deepest root. Here, by reason of the democratic nature of the people, it may be said to be distinctively American, as the German who first introduced it undoubtedly became an American citizen long ago and his successors are probably numbered among our best citizens even to the present time. Our people of all nationalities have adopted it and we find it installed in our churches, our family gatherings, our schools, and private clubs. Our nineteenth century inventor has even tried to change it into an affair of cast iron, through whose hollow trunk and branches gas pipes are conducted and gas jets among the branches take the place of candles. One of the results of all this is that the demand for Christmas trees and Christmas

greens has grown to enormous proportions in our larger cities and furnishes employment during the latter part of September and through November and December to a number of people who make a business of gathering the gay green branches and transporting them to market.

While traveling through the southern part of Maine a few years ago, I was struck by the symmetry and beauty of a tract of Evergreen Trees and remarked that they would make good Christmas trees. I afterward found that such was likely to be their fate, as men who make a business of "clam-whopping" and fishing during the summer months turned their attention during the fall to the business of gathering these trees and shipping them to New York, Philadelphia, and Boston.

In looking the subject up to determine what became of all these Trees I found an industry which I had not dreamed of. I find that the Christmas greens for New York City were first shipped from Keyport, N. J. That as the demand for them assumed larger proportions the raw material was exhausted in that neighborhood, but the inhabitants having become interested in the business, and finding it a source of profit, have continued to advance into the surrounding country, little by little, until now they are gathering Spruce from Maine, New Hampshire, and Vermont, Princess Pine from Vermont, White Pine from Michigan and even Wisconsin, Laurel and Holly from the South, and in fact they can now gather only Balsam on the home grounds in paying quantities.

In addition to the above-named evergreens, quantities of Ground Pine, Cape Flowers, Fir, Hemlock, the plants of the Club Mosses, berried Black Alder, Quill Weed, and Mistletoe are sought out and gathered wherever found and shipped—the Christmas trees to New York where they lie piled up by thousands along West street facing the dock lines, for several weeks before the holidays, and the other greens to Keyport

and vicinity where they are made up into stars, anchors, crosses, wreaths, hearts, triangles, horseshoes, and miles of roping for decorative purposes.

For the entire length of Monmouth county the families within a mile of the bay shore are nearly all engaged in the business of making these decorations at this season. Four miles from Keyport is the town of Keansburg which now surpasses the former place in this industry. Neighbors are referred to as "making" or "not making" and numbers of new faces appear in the town, attracted by the industry from the north, south, and west. The wages paid are not high but anyone who can "make" can always find a position during the busy season.

The small villages along this strip of country now present a pretty appearance. The houses are almost hidden behind stacks of evergreens of all kinds. A peep into a detached summer kitchen will disclose a group of girls gathered around a long table piled high with evergreens, and at first glance they appear to be principally engaged in pleasant conversation, but you will not have to watch them long before you are aware that their busy fingers are turning out Christmas decorations at an astonishing rate. Or, if you should happen to look in at night, you might see the tables and evergreens pushed to one side and gay groups of girls and young boat-builders, oystermen, and fishermen engaged in a lively neighborhood dance.

Materials other than evergreens are used in this industry to a considerable extent; laths are used to make frames

for the stars and crosses. Willows are gathered in quantities from the marshes with which frames for wreaths are made, but the trade in rattan is probably the most benefited, as nothing else will give such satisfaction in making the frames for hearts, anchors, and other decorations of this kind.

The completed decorations are shipped to New York, Philadelphia, and Boston, but not to Chicago. In Chicago we find a different state of affairs. We are so near the evergreen forests of Wisconsin, where Christmas trees may be had for practically nothing, that the cost of transportation alone from New Jersey would be greater than the price realized would amount to.

Numbers of hulks of condemned vessels lie in and around Chicago which are practically worthless. These boats are taken in the fall by seamen who are out of employment up along the Wisconsin coast and there loaded with evergreens, are brought back to the Chicago river and docked, and lie there until the load is disposed of to the holiday trade. The decorations are mainly manufactured in the city in the store-rooms of the dealers.

That the business of bringing these trees down from the north is not without serious danger and hardship is evidenced by the wreck of the schooner *S. Thal*, which occurred off the coast near Glencoe, Ill., a short time ago, in which five lives were lost. Five lives yielded up that our children may enjoy an hour of pleasure!

Do they ever think of the cost?

A WINTER'S WALK.

Gleamed the red sun athwart the misty haze
Which veiled the cold earth from its loving
gaze,
Feeble and sad as hope in sorrow's hour—
But for thy soul it still hath warmth and
power;
Not to its cheerless beauty wert thou blind;
To the keen eye of thy poetic mind
Beauty still lives, though nature's flowrets
die,

And wintry sunsets fade along the sky!
And naught escaped thee as we strolled
along,
Nor changeful ray, nor bird's faint chirping
song.
Blessed with a fancy easily inspired,
All was beheld, and nothing unadmired;
From the dim city to the clouded plain,
Not one of all God's blessings given in vain.
—Hon. Mrs. Norton.

THE SILKWORM.

THE Caterpillar, or Silkworm, is at first of a dark color, but soon becomes light, and in its tints much resembles the perfect insect—a circumstance common in Caterpillars. Its proper food is the Mulberry, though it will likewise eat the Lettuce, and some few other plants, on which, however, it does not thrive equally well, and the silk yielded is of a poor quality.

The Silkworm is about eight weeks in arriving at maturity, during which period it changes its skin four or five times. When about to cast its skin it ceases to eat, raises the forepart of the body slightly, and remains in perfect repose. In this state it necessarily continues for a time, in order that the new skin, which is at this time forming, may become sufficiently mature to enable the Caterpillar to burst through the old one. This operation is performed thus: The forepart of the old skin is burst; the Silkworm then, by continually writhing its body, contrives to thrust the skin back to the tail and disengage itself; this is difficult, however, since it is no uncommon occurrence for them to die from not being able to free themselves.

When full grown the Silkworm commences spinning its web in some convenient spot, and as it does not change the position of the hinder portions of its body much, but continues drawing its thread from various points, and attaching it to others, it follows that after a time its body becomes, in a great measure, enclosed by the thread. The work is then continued from one thread to another, the Silkworm moving its head and spinning in a zig-zag way, bending the forepart of the body back to spin in all directions within reach, and shifting the body only to cover with silk the part which was beneath it. In this way it encloses itself in a cocoon much shorter than its own body. During the time of spinning the cocoon the Silkworm decreases in length considerably, and after the work is done it is not half its original length. At this time it becomes quite torpid, soon changes its skin, and appears in the form of a chrysalis.

In this state the animal remains about three weeks; it then bursts its case and comes forth in the imago state, the moth having previously dissolved a portion of the cocoon by means of a fluid which it ejects. The moth is short lived; the female in many instances dies almost immediately after she has laid her eggs; the male survives her but a short time.

China was the first country in which the labors of the Silkworm were availed of, and Aristotle was the first Greek author who mentions it. It was not until the fifteenth century that the manufacture of silk was established in England. The raising of Silkworms in the United States has been attempted with success in the Southern States, and especially in California. As the Silkworms in Europe are affected by disease, immense quantities of eggs are sent from this country.

Reeling from the cocoons is only performed in countries where the silk is produced. In plain silk-weaving the process is much the same as in weaving wool or linen, but the weaver is assisted by a machine for the even distribution of the warp, which frequently consists of eight thousand separate threads in a breadth of twenty inches. The Jacquard loom, invented by a weaver of Lyons, has been the means of facilitating and cheapening the production of fancy or figured silks to an extraordinary extent.

The Pan-American delegates during their tour through this country were presented with silk flags by the Woman's Silk-Culture Association of Philadelphia. The flags were made from material produced in the United States.

The eggs from which our photograph was taken are "live eggs," and if properly handled will hatch out in the spring. In order to bring about this result care must be taken that they do not become too warm; freezing will not hurt them, but heat or dampness will cause them to hatch or spoil.

Forty thousand eggs weigh about one ounce, and when hatched will produce about one hundred pounds of fresh cocoons.

ANIMALS' RIGHTS.

That there is pain and evil, is no rule
That I should make it greater, like a fool.

—*Leigh Hunt.*

Never to blend our pleasure or our pride
With sorrow of the meanest thing that feels.

—*Wordsworth.*

"A GOOD man," said Plutarch, "will take care of his Horses and Dogs, not only while they are young, but when old and past service."

The organs of sense, and consequently feeling itself, are the same as they are in human creatures. I can't imagine how a man not hardened in blood and massacre is able to see a violent death, and the pangs of it, without concern.—*Bernard de Mandeville, 1723.*

However we may differ as to speculative points of religion, justice is a rule of universal extent and invariable obligation. See that no brute of any kind, whether intrusted to thy care or coming in thy way, suffer through thy neglect or abuse. Let no views of profit, no compliance with custom, and no fear of the ridicule of the world, even tempt thee to the least act of cruelty or injustice to any creature whatsoever. But let this be your invariable rule everywhere, and at all times, to do unto others as, in their condition, you would be done unto.—*Humphry Primmatt, D. D., 1776.*

But a full-grown Horse or Dog is, beyond comparison, a more rational, as well as more conversable animal than an infant of a day, a week, or even a month old. But suppose the case were otherwise, what would it avail? The question is not, Can they *reason*? nor, Can they *talk*? but, Can they *suffer*?—*Jeremy Bentham, 1780.*

Animals are endued with a capability of perceiving pleasure and pain; and from the abundant provision which we perceive in the world for the grati-

fication of their several senses, we must conclude that the Creator wills the happiness of these his creatures, and consequently that humanity towards them is agreeable to him, and cruelty the contrary. This, I take it, is the foundation of the rights of animals, as far as they can be traced independently of scripture, and is, even by itself, decisive on the subject, being the same sort of argument as that on which moralists found the Rights of Mankind, as deduced from the Lights of Nature.—*Thomas Young, 1798.*

The claims of the lower animals to humane treatment, or at least to exemption from abuse, are as good as any that man can urge upon man. Although less intelligent, and not immortal, they are susceptible of pain; but because they cannot remonstrate, nor associate with their fellows in defense of their rights, our best theologians and philosophers have not condescended to plead their cause, nor even to make mention of them; although, as just asserted, they have as much right to protection from ill-usage as the best of their masters have.—*W. Youatt, 1839.*

There is a moral as well as a physical character to all animal life, however humble it may be—enveloped indeed in obscurity, and with a mysterious solemnity which must ever belong to the secrets of the Eternal. Let us then approach with caution the unknown character of the brute, as being an emanation from Himself; and treat with tenderness and respect the helpless creatures derived from such a source.—*Ralph Fletcher, 1848.*

THE CALIFORNIA VULTURE.

Among the crags, in caverns deep,
The Vulture rears his brood;
Far reaching is his vision's sweep
O'er valley, plain, and wood;
And wheresoe'er the quarry lies,
It cannot 'scape his peering eyes.
The traveler, from the plain below,
Sees first a speck upon the sky—
Then, poised on sweeping wings of woe,
A Vulture, Bat-like, passes by.

—C. C. M.

DOCTOR BREWER states that the single species composing this very distinct genus belongs to western North America, and, so far as known, has the most restricted distribution of all the large raptorial birds in the world. It is found on the coast ranges of southern California from Monterey Bay southward into Lower California. It has become very much reduced in numbers and extinct in localities where it was formerly abundant, which is doubtless due to the indiscriminate use of poison which is placed on carcasses for the purpose of killing Wolves, Bears, Lynxes, Cougars, and other animals which destroy Sheep, Calves, and other cattle of the stockmen. Davie says it is more common in the warm valleys of California, among the almost inaccessible cliffs of the rough mountain ranges running parallel with the Sierra Nevadas for a hundred miles south of Monterey. It associates with the Turkey Buzzard, and the habits of both species are alike, and they often feed together on the same carcass.

The Vulture's flight is easy, graceful, and majestic. A writer who watched one of these gigantic birds thus pictures it: "High in air an aeronaut had launched itself—the California Condor. Not a wing or feather moved, but resting on the wind, like a kite, the great bird, almost if not quite the equal of its Andean cousin, soared in great circles, ever lifted by the wind, and rising higher and higher into the empyrean. Not a motion of the wing could be seen with careful scrutiny through the glass, but every time the bird turned and faced the wind it seemed to bound upward as though lifted by some superhuman power, then bearing away before it, gathering the force or momentum which shot its air-laden frame higher and higher until it almost dis-

appeared from sight—a living balloon."

The ordinary California Buzzard and the singular Ravens of Santa Catalina Island often give marvelous exhibitions of soaring or rising into the air without moving their wings, and when it is remembered that their bodies are reduced to a minimum of weight, and that even the bones are filled with air, it is almost scientifically and literally true that they are living balloons. And yet the weight of the Vulture is sometimes twenty-five pounds, requiring immense wings—eight and a half to eleven feet from tip to tip—to support it.

Mr. H. R. Taylor, of the late *Nidologist*, says there have probably but three or four eggs of the California Vulture been taken, of which he has one. The egg was taken in May, 1889, in the Santa Lucia Mountains, San Luis Obispo County, California, at an altitude of 3,480 feet. It was deposited in a large cave in the side of a perpendicular bluff, which the collector entered by means of a long rope from above. The bird was on the nest, which was in a low place in the rock, and which was, the collector says, lined with feathers plucked from her own body. This assertion, however, Mr. Taylor says, may be an unwarranted conclusion. From the facts at hand, it appears that the California Condor lays but a single egg.

The Condor is not an easy bird to capture, for it has a fierce temper and a powerful beak. An unusually large one, however, was recently taken in Monterey County, California. To catch the mighty creature William J. Barry made use of a lasso, such as ranchmen have with which to round up obstreperous cattle. The strength of one man was barely sufficient to imprison it. It is said that the appetite of the bird was not affected by its loss of liberty.



From col. F. M. Woodruff.

CALIFORNIA VULTURE.
 $\frac{1}{2}$ Life-size.

Copyright 1898,
Nature Study Pub. Co., Chicago.

A GAMELESS COUNTRY.

THE West Indian Archipelago, with its four islands and numberless islets, is called the gameless country, because in a region of more than 100,000 square miles there are no Monkeys, Bears, Raccoons, Wild Hogs, Jaguars, Pumas, Panthers, Lynxes, Wild Cats, Foxes, Wolves, or Jackals. There is not even a Woodchuck to be dug out of the many caves. Dogs and Cats, too, are unknown, and this lack of household pets seems to have driven the aborigines to expedients, for in a book called "Ogilvy's Voyages" there is a story told of a San Domingo native who kept a tame Manatee or Sea Cow that made its headquarters in an artificial pond, and was so well trained that when called by its name it would come out of the water, go to a neighbor's house and

after receiving food return to the pond, accompanied by boys who seemed to charm it by singing, and it often carried two children on its back. Its instinct was wonderful. It was once struck by a pike in the hand of a Spaniard and after that always refused to come out of the water when there was a clothed man near.

Manatees are often seen northwest of Cuba in shoals, sporting about the reefs like Sea Lions. They are cunning creatures and can dodge the harpoon with more success than any other aquatic animal. The largest land animal of this strange territory is a huge Rat, measuring eighteen inches in length without the tail. With this exception, it is claimed, Cuba, Jamaica, San Domingo, and Porto Rico have no land animals.

SNOWFLAKES.

Out of the bosom of the air,
Out of the cloud folds of its garments
shaken,
Over the woodlands brown and bare,
Over the harvest fields forsaken,
Silent, and soft, and slow,
Descends the snow.

Even as our cloudy fancies take
Suddenly shape in some divine expression,
Even as the troubled heart doth make
In the white countenance confession,
The troubled sky reveals
The grief it feels.

This is the poem of the air,
Slowly in silent syllables recorded;
This is the secret of despair,
Long in its cloudy bosom hoarded,
Now whispered and revealed
To wood and field.

—Longfellow.

THE AMERICAN GOLDEN-EYE.

We watch the hunters creeping near
Or crouching in the silvery grasses;
Their gleaming guns our greatest fear,
As high o'erhead our wild flock passes.

But we are of the air, and speed
Like meteors dropping from the sky;
He's "the man behind the gun" indeed
Who can fairly wing a Golden-eye.

—C. C. M.

FOR beauty this bird will compare favorably with any of the family except the Wood Duck, whose colors are more various and brilliant. Whistler is the name by which it is more commonly known, from the peculiar noise of wings made while flying. In spite of its short, heavy body and small wings, it covers immense distances, ninety miles an hour being the speed credited to it by Audubon, who, however, was not always accurate in his calculations. It is an abundant species throughout the fur countries, where it frequents the rivers and fresh-water lakes in great numbers. It breeds as far north as Alaska, where, on the Yukon, it nests about the middle of June. Like the Wood Duck, it makes its nest in hollow trees and decayed trunks. This consists of grass, leaves, and moss, lined with down from the bird's breast. The eggs are from six to ten in number, and ashy green in color.

The Golden-eye is a winter visitant to Illinois. On Long Island it is better known among the hunters as the "Whistler," and by others it is also called the "Great-head," from its beau-

tifully rich and thickly crested head. On that island it is said to be a not very abundant species, arriving there in company with other migratory Ducks. Mr. Girard met with it in the fall and spring on the Delaware and in Chesapeake bay. Its food consists of small Shell and other Fish, which it procures by diving. In the fall the flesh of the Golden-eye is very palatable. It is very shy and is decoyed with great difficulty. In stormy weather it often takes shelter in the coves with the Scoup Duck, and there it may be more readily killed. Naturally the Golden-eye is chiefly seen in company with the Buffle-head, the Merganser, and other species that are expert divers like itself. When wounded, unless badly hurt, its power of diving and remaining under water is said to be so remarkable that it cannot be taken.

The Golden-eyes always have a sentinel on the watch to announce the approach of an enemy. They have been very little studied in their haunts. The word *Clangula* indicates in some degree the tone of their voices. They swim under water like fish, out of which they can bound upward and make off with prodigious speed.

GOLDEN ROD.

A lady who has lately been making a visit in the West was telling the other day about the forlorn aspect of the country out that way to her. "Even the Golden-rod," she said; "you can't imagine how scraggly and poor it looks, compared with our magnificent flowers along the road here. I wonder what makes the Western Golden-rod so inferior." The very next day there arrived at her house a relative whom she had been visiting when she was in the West. He sat on the veranda, and looked in-

dulgently—even admiringly—at the landscape, and praised its elements of beauty. But as his eye ran along the roadside near by, he said: "But there is one thing that we are ahead of you in—you have no such splendid Golden-rod here as we have out West! The Golden-rod growing along that road, now, is tame and poor compared with ours." What a blessed thing it is that the gold of our own waysides is richer than the gold of all other waysides!



THE AMERICAN SKUNK.

THIS little animal is distinctively American, the one figured being found only in North America. It has a beautiful jet-black fur, varied with a larger or smaller amount of white forming a stripe on each side of its body and head, and more or less of its tail. In some cases the white is reduced to a small "star" at the top of the head, and without doubt some specimens are entirely black, while occasionally a white specimen may be seen.

The fur of the Black Skunk is considered the best, and brings the highest price which decreases as the amount of white increases, the white ones being almost valueless. A slight unpleasant odor clings about the manufactured fur, which detracts much from its commercial value, although some dealers claim that this is never noticed when it is sold as "Alaska sable."

Another common name for the Skunk is Polecat. Though found in the woods, they prefer to inhabit grassy or bushy plains. During the day they lie sleeping in hollow trees or stumps, in clefts of rocks, or in caverns, which they dig for themselves; at night they rouse themselves and eagerly seek for prey. Worms, insects, birds, and small animals, roots and berries constitute their food.

The range of the Skunk is quite extensive, the animal being most plentiful near Hudson Bay, whence it is distributed southward.

It is slow in its movements, can neither jump nor climb, but only walk or hop. Knowing how formidable is its weapon of protection, it is neither shy nor cowardly.

The Skunk is a much respected animal, both man and beast preferring to

go around him rather than over him, and many amusing anecdotes are related by hunters and naturalists, which lead us to believe that he does not always come out second best in an encounter. When in search of food he is so bold that he can be approached without difficulty, and he wears a look of innocence that effectually deceives the uninitiated, and brings about very unexpected results.

Hensel says that when it is pursued by dogs it lays its tail along its back like a sitting Squirrel, turns its hinder quarters towards the dogs and performs queer, angry, hopping antics, such as one sometimes sees in the cages of Bears. The attacked animal never wastes its secretion by unnecessary haste, but continues to threaten as long as the dogs are a few yards distant from it.

"Skunk Farming" cannot be said to be a growing industry, but there are a number of such "farms" in the northern and eastern states which are said to pay fairly well. A small plat of land is enclosed by a high board fence; stakes are driven into the ground close together under the fence so that the animals cannot burrow out. Small shelters are built in, some hay thrown in for nests, and the farm is ready for the skunks.

Skunks get very tame in captivity and tolerably well accustomed to their keeper, though great care is required not to irritate them. Hay is their favorite bed, on which they curl up like a ball. After eating, they wipe their snouts with their forepaws, being very cleanly, and they always keep their fur dainty and dressed. The fur is not very fine or soft, but it is valuable and in considerable demand.

BIRDS IN "THE ILIAD."

EMILY C. THOMPSON.

THE universe is so ordered that Birds are essential to the life of Man. To-day we believe this and value them accordingly. Years ago as well as now the birds held the same relation toward man but the latter did not then understand this relationship as we do in this age of scientific enlightenment. About twenty-eight hundred years ago, nine hundred years before the beginning of our era, a poet flourished in the East, or certain poets as some scholars maintain. He is supposed to have been a blind bard, who wandered around to the courts of the petty kings, sang his heroic lays and left them for our inheritance, and a noble inheritance it is to those who have the desire and will to go to the depth of the treasure. These poems tell of the people of that time and show us many sides of their life and the chief characteristics of their civilization.

One scarcely expects from a great poem, dealing with war and adventure, to gather information about birds. Yet it is there, but not so much scientific as ethical. Birds, they believed, were here on earth as the messengers of the gods. Rarely did a bird appear before them or raise a cry which did not do so by the direct command of some ruling divinity. Imagine with what anxiety these old Greek heroes watched for and listened to the heaven-sent messages. Great was the fear at certain omens, and great the rejoicing at others. As a rule only special men could interpret these signs and these men were of immense importance in a community. They were almost a priesthood in nature, as nearly so as any order which the people then possessed, for the priesthood was not developed at that time.

In the Iliad, at four of the critical points in the story a bird appears and shows the will of the gods to mortals. It is related that before the Greeks sailed to Troy, while the ships were yet assembled at Aulis, one of these omens occurred and was interpreted thus: Near the ships was an altar and by the

altar stood a plane-tree, upon the bough of which a little bird had built its nest, and already within the nest were nine fledglings. Suddenly a serpent darted forth from beneath the altar straight toward the tree; the nine little birds were soon devoured and at last the serpent ended his feast by catching the mother which had flown crying about it. At once the serpent was turned into stone. This wonderful prodigy was shown by one of the prophets to mean that for nine years the Greeks would toil fruitlessly before Troy as the serpent had devoured the nine little birds; but in the tenth year they would seize the city.

The flight of birds was watched and upon this rested often the movements of whole armies. As the seer had foretold for nine years the Greeks had been fighting before the walls of Troy; their ships were drawn up on the shore of the sea and before them they had built a wall and dug a ditch for protection. The nine years had passed, the tenth year was already going by and never had the people from the beleaguered city dared to approach their ships. But now, after so many years, all was changed. The great hero of the Greeks, the great swift-footed Achilles, was angry and refused to fight for them and sat apart at the stern of his ship on the shore of the barren sea wearing out his heart with anger. Now the Trojans, never before so successful, had reached the wall and were encamped there for the night. The Greeks felt that it was necessary to send out spies to observe the movements of their foes. Diomedes volunteered his services and chose Odysseus for his comrade. They crept away from their companions in the darkness but had gone only a few steps when the cry of a Heron was heard on their right. This meant good luck for them, for they knew that Athene, the protecting goddess of Odysseus, had sent this favoring sign, and it proved true, for their sally was prospered and they returned unharmed, having slain



thirteen of the enemy, and bringing as booty a noble pair of steeds, a prize in which all Greeks took delight.

Even in Homer we see the dawning of skepticism, a skepticism of which we approve and the sentiment of which we cannot but admire. The next day after the favorable sign of Athene to her favorite, after nine long years of terrible war the Trojans stand at the very edge of the ditch before the Greek ships. Hector their noble leader, a hero who may well inspire modern men to noble deeds of patriotism, stands at their head. One rush more, one impetuous dash through the ditch and against the wall, and the ten years' war may be ended with the weary Trojans victors. But at this critical moment a bird appears, it is the favorite bird in Homer and also the favorite bird with us, for it is our national bird, the Eagle. Homer calls it the bird that is surest to bring fulfillment with its omens and tells us that it belonged to mighty Zeus the thunderer, the ruler of gods and men. The bird appeared flying at the left. The people halted. A bird flying at the left meant disapproval. It held in its mouth a snake not yet dead, which, coiling its head, bit at the breast of the bird. The bite was effective, and with a sharp cry, the bird dropped the serpent at the feet of the awe-inspired Trojans and fled shrieking away. Well might the people halt. What was to be done, an onward move against such a portent, or a calm withdrawal when everything was in their favor? One of the common people declared that they must withdraw or death would come upon them. Then noble Hector with frowning brows answered him: "Polydamas, no longer do you speak words pleasing to me. You know how to speak another word better than this. If you speak this truly in earnest, the gods themselves have taken away your senses from you who bid me to forget the counsels of high-thundering Zeus, the promises he made me and the plans to which he nodded assent. You bid me put my trust in long-winged birds which I do not heed or regard at all, whether they fly to the right toward the sun and the dawn, or to the left toward the murky darkness. Let us trust the counselings of great Zeus who holds sway over

gods and men. One bird is the best to defend one's fatherland."

In the last book of the *Iliad* in the sad scenes surrounding the death and burial of this hero we have again an omen. Priam, the aged, feeble man, determined to go to the strange, wrathful Achilles and beg for the body of his dear son Hector, which the swift-footed hero had been mutilating in his wrath, dragging it behind his chariot about the city walls. Priam was determined to go. His wife tried to dissuade him from such a dangerous undertaking, he bade her not to be a bird of ill omen in his halls, but she insisted, and finally persuaded him to pray to Zeus to send him an omen that his journey would be successful. He prayed; thereupon an Eagle appeared flying at his right. Hecuba was now satisfied and the old lord of windy Troy started out on his errand of love. The omen was true this time for he did persuade the heart of Achilles and returned to his city with the remains of his son.

There are other instances of omens given by the presence and flight of birds, but these are sufficient to show us the great importance which the men of two thousand years ago attributed to them. Although birds are most prominent in Homer in this connection, still we find them mentioned many times just as parts of the physical world and without divine import. Among the birds thus mentioned we find names which our scholars have interpreted to designate Cranes, Meadow Larks, Jackdaws, Geese, Swans, Nighthawks, Vultures, and Eagles. Birds are especially noted for their quickness in flight, and the horses were most prized which flew like the birds. Birds were always mentioned in connection with the dead, and a favorite curse was to wish that one might be left a prey to the dogs and birds.

Gods often honored this part of the animal world by assuming their forms. We find Athene and Apollo in the likeness of Vultures settling down upon the Oak tree to watch the battle of the Greeks and Trojans. Sleep watches the wiles of Juno toward her lord while he sits as a Nighthawk upon a tree. But Homer is essentially a poet, and in

many places a nature-poet, and in these touches of nature he does not forget the birds, but very often compares the movements of his heroes to them.

"As a tawny Eagle darts upon the flocks of winged birds feeding by the river, flocks of Geesè, of Cranes, of long-necked Swans, so Hector darted upon them."

"The Trojans went with hue and cry—like the birds when the cry of the Cranes is in the front of heaven, who, when they flee from the winter and portentous storms, with cries fly to the streams of Oceanus, bearing death and fate to the Pygmies, and at dawn they bear forth with them their evil strife."

"As a bird bears a morsel for its un-

fledged young whenever it obtains any, but fares badly itself, so I have toiled for other men and gained naught myself."

"As many flocks of birds, of Geese, Cranes, long-necked Swans, in an Asian meadow by the banks of the Cayster fly hither and thither exulting in their wings as they settle down with cries and the meadow reëchoes, so flocks of men poured from the tents and ships into the plain of the Scamander."

"As a flock of Meadow Larks or Jackdaws comes with full, unbroken cry when they see before them a Hawk which bears destruction to small birds, so with full, unbroken cry went the youths of the Achæans before Æneas and Hector."

SUMMARY.

Page 206.

AFRICAN LION—*Felis leo capensis*.

RANGE—All over central and southern Africa from the western to the eastern coast, and as far north as the 20th degree of northern latitude.

Page 210.

CACTI — (1) *Echinocadus Le Contii*, Tempe, Arizona. (2) *Mamillaria Sheerii*, Nogales, Arizona.

Page 214.

AMERICAN FLYING SQUIRREL — *Pteromys volucella*.

RANGE—All over the United States and Central America.

Page 218.

HUMMINGBIRDS — (1) *Lampornis gramineus*, Venezuela. (2) *Petasophora Anais*, Columbia. (3) White-tailed Hummer.

Page 223.

SILK-WORM—*Bombyx mori*. Originally from China.

Page 227.

CALIFORNIA VULTURE—*Pseudogryphus californianus*. Other name: California Condor.

RANGE—Coast ranges of southern California from Monterey Bay southward into Lower California; formerly north to Frazer River.

NEST—On the bare floor of a cave in a lofty precipice.

EGG—One.

Page 231.

AMERICAN GOLDEN-EYE—*Glaucionetta clangula americana*. Other names: Whistler, Whistle Wing, Brass-eyed Whistler, Great Head, Garrot.

RANGE—North America, nesting from our northern boundaries to the far south, and wintering in the United States southward to Cuba.

NEST—In hollow trees, lined with grass, leaves, and moss.

EGGS—Six to ten, ashy green in color.

Page 235.

AMERICAN SKUNK—*Mephitis varians*.

RANGE—Extensive, being most plentiful near Hudson Bay, whence it is distributed southward.

INDEX.

VOLUME IV.—JULY TO DECEMBER, 1898.

A Bloodless Sportsman.....	39
A Book By the Brook	39
Acorn, Thirty Miles for an	29
African Folk Lore	12
Ah Me!	113
Alaska, Birds of	95
All Nature.....	37
Almond, Flowering (<i>Amygdalus communis</i>).....	193-5
Animals and Music.....	159
Animals' Rights.....	225
Animals, Some Propensities of.....	81
Animals, Talk of.....	140
Animals and Water.....	84
Animal World, In the.....	136
Antelope, The Pigmy (<i>Antilope pigmea</i>).....	94-95
Apple Blossoms.....	35
Armadillo as a Pet	12
Armadillo (<i>Tatusia novemcincta</i>).....	146-7
Autumn	132
Azamet, the Hermit, and His Dumb Friends.....	33
Bat, Black (<i>Scotophilus carolinensis</i>) }	170-1
Bat, Red (<i>Atalapha noveboracensis</i>) }	170-1
Bats, Tame.....	168
Birds	163
Bird, A Little.....	162
Bird Courtship.....	164
Birds Foretell Marriage.....	16
Birds in the Garden and Orchard.....	153
Birds in the Iliad	234
Birds Mentioned in the Bible.....	48
Bird of Paradise, The King (<i>Cincinnurus regius</i>).....	124-6-7
Birds, Sleeping Places of.....	164
Birds and Animals of the Philippines.....	48
Birds, Reasoning Powers of	43
Birds in Storms.....	163
Bobolink's Song.....	61
Butterfly, The	142
Butterflies	102
Butterflies (illustrations).....	23, 63, 103, 143, 183, 223
Butterflies, How Protected.....	62
Butterfly Trade.....	22
Butterflies Love to Drink.....	182
Cactus (<i>Echinocadus le Contii</i>) (<i>Mamillaria Sheerii</i>).....	210-11
Christmas Trees	220
Color Photographs and Conversation Lessons.....	194
Constantinople, From.....	158
Count? Can Animals.....	180
Country, A Gameless	229
Dolphin, The Bottlenose (<i>Tursiops tursio</i>).....	134-5
Doves of Venice	100
Ears.....	121
Eyes.....	117
Farewell, The Turkey's.....	162
Fern, The Petrified.....	83
Flowers, The Death of the.....	189
Flowers, The Use of	34
Fox, The American Gray (<i>Vulpes virginianus</i>).....	105-6-7
Fox, The Red (<i>Vulpes fulvus</i>).....	66-7-9

Golden-eye, American (<i>Glaucionetta clangula americana</i>).....	230-1
Goldenrod (<i>Solidago Virga-aurea</i>).....	154-5
Grouse, Prairie Sharp-tailed (<i>Pediocætes phasianellus campestris</i>).....	166-167
Gull, Herring (<i>Larus argentatus Smithsonianus</i>).....	86-7
Hawk, Red-shouldered (<i>Buteo lineatus</i>).....	96-8-9
Hen, Prairie (<i>Tympanucus americanus</i>).....	18-19
Humming-birds (1 <i>Lampornis gramineus</i>) (2 <i>Pelasophora anais</i>) (3 <i>White-tailed</i>)	216-18-19
Instinct and Reason.....	73
Lion, African (<i>Felis leo</i>).....	206-7
Loon, The (<i>Urinator inuber</i>).....	58-9
Midsummer.....	65
Miscellany.....	109
Mocking-birds at Tampa, Florida.....	61
Myths and the Mistletoe.....	212
Nature's Adjustments.....	41
Nature's Grotesque.....	149
Nature Study and Nature's Rights.....	176
Nature, The Voice of.....	136
Nature's Orchestra.....	161
Ocelot, The (<i>Felis pardalis</i>).....	30-1
October.....	157
Otter, American (<i>Lutra canadensis</i>).....	172-4-5
Peccary (<i>Dicotyles torquatus</i>).....	128-130-1
Pet, A Household.....	52
Pigeon, The Passenger.....	25
Plover, The Golden (<i>Charadrius dominicus</i>).....	178-9
Porcupine, Canadian (<i>Erethizon dorsatus</i>).....	186-7
Puffin, The Tufted (<i>Lunda cirrhata</i>).....	138-9
Rabbit, The American (<i>Lepus sylvaticus</i>).....	26-7
Raccoon, American (<i>Procyon lotor</i>).....	90-1
Red Head (<i>Aythya americana</i>).....	150-1
Sandpiper, The Least (<i>Tringa minutilla</i>).....	70-1
Sandpiper, The Pectoral (<i>Tringa maculata</i>).....	114-15
Secrets of an Old Garden.....	16
Seminary for Teaching Birds How to Sing.....	78
Sheep, Mountain (<i>Ovis montana</i>).....	74-5
Silk Worm, The (<i>Bombyx mori</i>).....	222-3
Skunk, American (<i>Mephitis varians</i>).....	233-5
Skylark, The.....	176
Snipe, Wilson's (<i>Gallinago delicata</i>).....	6-7
Snowflakes.....	229
Songsters, About the.....	21
Sparrow, New Champion for.....	135
Squirrels, Flying (<i>Pteromys volucella</i>).....	214-15
Squirrel, Fox (<i>Sciurus cinereus</i>).....	54-5-6
Squirrel, American Gray (<i>Sciurus carolinensis</i>).....	110-11
Squirrel, The Hunted.....	119
Squirrel, Red (<i>Sciurus hudsonius</i>).....	14-15
Squirrel Road, The.....	44
Squirrel Town.....	4
Summary.....	40, 80, 120, 160, 200, 238
Symbol, A.....	208
Tern, Caspian (<i>Sterna tschograva</i>).....	190-1
Tern, The Common (<i>Sterna hirundo</i>).....	46-7
Useful Birds of Prey.....	88
Voices.....	201
Vulture, California (<i>Pseudogryphus californianus</i>).....	226-7
Walk, A Winter's.....	221
Wild Birds in London.....	92
Wolf, Black (<i>Canis occidentalis</i>).....	8-10-11
Wolf, Prairie (<i>Canis latrans</i>).....	50-1
Wren, The Envious.....	185

Birds and All Nature

IN NATURAL COLORS

A MONTHLY SERIAL

FORTY ILLUSTRATIONS BY COLOR PHOTOGRAPHY

A GUIDE TO THE STUDY OF BIRD-LIFE

TWO VOLUMES A YEAR

VOLUME V.

JANUARY, 1899, TO MAY, 1899

EDITED BY C. C. MARBLE

CHICAGO

A. W. MUMFORD, PUBLISHER

203 Michigan Ave.

1899

COPYRIGHT 1899
BY
NATURE STUDY PUBLISHING CO.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. V.

JANUARY, 1899.

No. 1

"TESS."

A REMARKABLE example of the human-like intelligence of a chimpanzee, rivaling that of the celebrated "Mr. Crowley," of New York, so long the chief object of admiration in the museum of Central Park, was that of the subject of this sketch. "Tess" was captured in Africa by Allan Grosch and brought to Boston, where she was purchased by Frank C. Bostock. She was brought up with Mr. Bostock's little girl and was dressed the same as any child of three years. She walked upright, ate with knife and fork, drank from a cup, had better table manners than the average child of the same age, wore finger-rings, earrings, and pin, and always surveyed herself in the glass to see that her pin was on straight, and her dress hung right; she smoked a pipe, drew lines on a blackboard, wrote with a pen, and imitated Mr. Bostock's little girl in many ways. She uttered a few sounds which were understood by her master, and seemed to understand what was said to her. She died of pneumonia while being exhibited in the East, was purchased by Mr. C. F. Gunther and presented by him to the Chicago Academy of Sciences. Her age was three years and seven months.

The chimpanzee (*Simia troglodytes*) is considerably smaller than the gorilla; old males reach a height of sixty-four inches; females, forty-eight inches. The arms are long, reaching a little below the knee, and possess great muscular power. In the feet the large toe is separated from the others by a deep incision; and the sole is flat. The hair of the chimpanzee is smooth, the color usually black, but in some specimens it is a dull, reddish brown. Chimpanzees walk on all fours, resting themselves on the calloused backs of their hands.

The toes of the feet are sometimes drawn in when walking. Naturalists say there is a strong inclination in this species to show remarkably varying individual types, which has led to controversies as to whether there were not several different species.

That the chimpanzee was known to the ancients is made fairly certain by the famous mosaic picture which once adorned the temple of Fortuna, and which is said to be still preserved in the Barberini palace at Palestrina in Italy. This mosaic represents, among many other animals of the Upper Nile country, what is believed to have been the chimpanzee. A young specimen was taken to Europe in the beginning of the seventeenth century. They have been taken there repeatedly since and are not infrequent features of the European animal market. Several have been brought to the United States and placed in museums and menageries.

It was formerly believed that the chimpanzee was a gregarious animal, but it is now known that there are seldom more than five, or, at the utmost, ten living together. Sometimes, however, they gather in greater numbers for play. One observer claims to have seen at one time about fifty of them which had assembled on trees and amused themselves with screaming and drumming on the tree trunks. They shun human habitation. Their nests are built in trees, not at a great height from the ground. They break and twist and cross larger and smaller branches and support the whole on a strong bough. A nest will sometimes be found at the end of a bough, twenty or thirty feet from the ground. They change abiding places often in looking for food or for other reasons. Two or more nests are rarely seen in the same tree. Nests,

properly so-called, consisting of interwoven branches, as DuChaillu describes, have not been seen by any of the other narrators.

When in repose the chimpanzee in the wild state usually assumes a sitting posture. He is often seen sitting or standing, but it is said the minute he is detected he drops on all fours and flees. He is an adept at climbing. In his play he swings himself from tree to tree and jumps with amazing agility. His food consists of fruits, nuts, buds, etc.

While "Tess" was remarkably intelligent she was too young to show the maturity of one in Nills' Zoological Garden in Stuttgart, an account of which is given by the celebrated painter of animals, F. Specht. This chimpanzee could laugh like a human being. He took notice of this, for no other animal can show its joy by loud laughter. When he would take the sympathetic fellow under the arms, throw him in the air and catch him, the cage rang with his merry peals of laughter. One day he took along a piece of chalk and sat down on a chair. In a moment the chimpanzee was sitting on Specht's knees awaiting further developments. He put the chalk in the animal's hand, and leading it, drew several figures on the wall. When he released the chimpanzee's hand, the animal started to shade the drawings with such diligence that they soon disappeared, to the great amusement of the spectators.

There are now, or were a few years ago, two chimpanzees in the Stuttgart

zoological garden, which are the closest of friends. The female had been there before and when the male arrived his box was put over night in her warm, roomy cage, the presentation being intended for the morrow. When the box, which, by the way, had been upholstered, was opened and the male got out, they both stood on their hind legs for a few minutes earnestly gazing at each other. Then they flew into each other's embrace and exchanged hearty and repeated kisses; and the female brought her blanket, spread it on the floor, sat down on it and by gestures invited the male to do likewise. It made a charming picture to see these two taking their meals at a table. They both used spoons and did not in the least interfere with each other. The female had the peculiarity of cautiously taking the male's glass, and drinking a goodly portion out of that, too, after which she returned it. Both of these animals laughed heartily when at play.

Barnum, the American showman, had two chimpanzees, "Nip" and "Tuck," on exhibition in various cities and towns, but they did not display much intelligence, nor did they live long. Other attempts to introduce the chimpanzee have not been encouraging. The experiment of keeping one has not been tried in the South, however, where there are doubtless cities whose climatic condition would prove to be favorable for keeping chimpanzees much longer than is possible in the more northern zoological collections.

WHIP-POOR-WILL.

Hark! I hear the voice again,
Softly now and low,
When the twilight's o'er the plain
And the first stars glow.
This is what it uttereth—
In a rather mournful breath—
"Whip-poor-will! Whip-poor-will!"

What has Will been doing now?
Has he truant played
With a sad, coquettish brow
From some simple maid?
Did he steal her heart away?
For I hear you always say
"Whip-poor-Will! Whip-poor-Will!"

Tell me now what Will has done.
Who's to whip him, dear?
Is he some scamp full of fun
That is straying near?
Have you caught him at your nest
By the ones you love the best?
"Whip-poor-Will! Whip-poor-Will!"

That is all you seem to say,
Little bird so shy.
Tell me now, without delay,
Why whip Will, oh! why?
There! your voice fades in the lea
Leaving this command to me,
"Whip-poor-Will! Whip-poor-Will!"
—Monroe H. Rosenfeld.

TONGUES.

W. E. WATT.



THE tongue is said to be the stomach begun. It is the first organ of the digestive system which acts upon the food. It is the source of much of the pleasure of life, particularly to young people. As it stands at the entrance to the alimentary canal it is endowed with powers of detecting the qualities of whatever the hands present to the stomach.

In early life the system demands abundant supplies of good material to build up growth and maintain activity. The sense of taste is then peculiarly keen, and the appetite for good things is strong. After maturity the desires become less and one has not so much pleasure in eating unless by active labor or from some other cause the digestive organs are kept in a robust condition.

With the years the tastes change. We wonder how children can possibly eat such quantities in such combination. The food which fairly delighted us long ago has little or no attraction for us, and with many adults there is need for strong seasoning and condiments which children avoid.

The child clamors for sweets. The adult is inclined to check the child in eating that which would not digest in the adult's stomach. But Herbert Spencer won the hearty esteem of the youngster when he gave scientific argument showing that growing children need highly concentrated foods to meet the demands of nature, and they may be permitted, in fact encouraged, to eat freely of foods which are unsuited to mature people.

The tongue's special work is telling us whether a given substance is good for us. Like other senses it may be deceived and is not always to be relied upon. And when it has told us once correctly we may make a serious mistake in following its advice too ex-

tensively so as to learn that too much of a good thing is not all good.

Nearly all substances have taste. That is, the tongue has power to tell us something about almost every substance in nature. Water is about the only substance found in nature that has no taste. But we rarely find water that is pure enough to be entirely without taste. Nearly all solids that can be dissolved in water have taste. So have nearly all liquids. When we say that water tastes good we recognize the mineral in it, or some combination of minerals that the human body needs in its economy.

The substances that the taste recognizes most readily are common salt, vinegar, quinine, pepper, and alcohol. Those least exciting to the tongue are starch, white of egg, and gum.

The tongue does its work by means of three sorts of papillæ which cover its surface. There are many very fine ones all over the tongue, but these are most numerous near the tip. Some larger ones which are not so pointed in form are also more plentiful near the tip of the tongue. And there are from eight to fifteen much larger still that are arranged in rows like the letter V at the base of the tongue.

Bitter is tasted mainly at the back of the tongue. Sweet is tasted all along, but is most delightful at the base of the tongue, and it is by this cunning arrangement that nature gets the tongue to pass the sweet morsel along to the throat where it is seized and hurried downward by the act of swallowing.

These papillæ have within them capillary blood vessels and the filaments of nerves. They are the seat of the tongue's sensibility. Whatever is tasted must come into chemical action over these little points. Moderate pressure helps the sensation, so we smack our tongues sometimes when we are not in

company. Cold deadens taste to some extent and heat acts in nearly the same way. Rinse the mouth with very warm or very cold water and then take in a solution of quinine at about forty degrees temperature and the bitter fluid will have almost no bitterness till the temperature of the mouth and its contents becomes somewhere near one hundred degrees.

Three things are necessary in a substance in order that it may be tasted, and it is curious to note how common are all three. First, it must be easily mixed with the saliva; second, it must easily spread itself about so that it may mingle with the mucus that always covers the papillæ; and third, it must be capable of acting chemically on the protoplasm of the end organs when once it gets into the taste bulb. All tasteless substances have one or more of these qualities lacking. Wipe the tongue dry and place a sugar crystal upon it. No taste will be experienced until the spot is moistened.

All substances do not taste alike to different tongues. We have noted the difference in appreciation of certain foods in infancy and in mature years. Water tastes differently to the fever patient and to the well man. As substances taste differently at different times to the same person, so they vary with individuals. One tongue is found on careful examination to have three times as many papillæ as another, one system is more susceptible to chemical action than another, and the nervous system varies enough in different subjects to make a considerable difference in the powers of taste.

One guest at table is delighted with a dish which appeals not at all to the palate of his neighbor. In fact there are cases where the power of taste has been temporarily or entirely lost. In such cases the patient goes on with his daily eating in a mechanical way, not because it tastes good, but because he must.

There seem to be different nerves for sweet, for bitter, for salty things, and for acids. Substances are known to chemistry which act differently on the nerves of the front and those of the back of the tongue. They very cur-

iously taste sweet to the nerves of the tip of the tongue and at the same instant bitter to those at the base. If leaves of the *Gymnema sylvestre* be chewed, sweet and bitter things are tasteless for awhile although acids and salts are tasted as usual.

Let an electric current pass through the tongue from the tip to the root and a sour taste will be experienced at the tip. But no one has yet explained why when the same sort of current is passed through in the opposite direction the taste is alkaline.

Place a small piece of zinc under the tongue and a dime on top. The saliva which moistens them will cause them to form a small galvanic battery. As they are allowed to touch each other at the tip of the tongue a sour taste will be experienced and in the dark a spark will appear to the eyes.

There is a pretty microscopic formation on the sides of some of the papillæ. It consists of rows of small openings or sacs egg-shaped with very minute mouths at the surface. These are known to science as taste bulbs. They are so small that three hundred of them put together the long way will scarcely reach one inch. They are so numerous that 1,760 have been counted on one papilla of an ox's tongue. They are not entirely confined to the surface of the tongue, for they have been found in large numbers upon the soft palate and the uvula, and many have been discovered on the back side of the throat and down into the voice box, some of them even appearing upon the vocal cords. Their form is much like that of a long musk melon, but they are too small to be seen by the naked eye. The outer part or rind consists of rows of cells evidently formed to hold what is within. On the inside are from five to ten taste cells which are long enough to reach the whole length of the bulb and protrude slightly at the opening where they are finely pointed. They are attached at the other end and branch out as if to run to several extremely fine divisions of the nerves.

Birds and reptiles have no taste bulbs in their papillæ. Tadpoles and freshwater fishes have similar bulbs in their skin, and it is thought they enjoy the

taste of things around them without the necessity of taking them in at the mouth.

We give the sense of taste more credit sometimes than it merits. What we regard as tastes are often flavors or only smells. What is taken in at the mouth gets to the nose by the back way if it is of the nature of most spices, and so by use of the nose and the imagination we taste things that do not affect the tongue at all. A cold in the head shows us we do not taste cinnamon, we merely experience its pungency as it smarts the tongue while its flavor we enjoy only with the nose.

With some substances we have a mixed experience that passes for taste, but it is really a combination of taste, smell, and touch. With the nostrils held one can scarcely distinguish between small quantities of pure water and the same with a very little essence of cloves. The difference is easily observed with the nostrils open or after swallowing, for the odor of the mixture gets readily into the nose from either direction.

It is curious to note that, although there are so many varieties of taste, man has but few words to describe them with. We know the taste of a thousand substances, and yet we are in nowise superior to the veriest savage in the matter of speaking about their flavors. We are obliged to speak in the same manner as the wild man of the forest and say that a given taste is like the taste of some other thing, only different.

One of the lowest forms of tongues is that of the gasteropod. All snails and slugs are gasteropods. They have instead of a regular tongue a strip that is called a lingual ribbon, one end of which is free and the other fastened to the floor of the mouth. Across the ribbon from left to right run rows of hard projections almost like teeth. Whatever the mouth comes against is tested for food qualities by this rasping ribbon which files away at the substance and wears away not only what it works upon but the ribbon itself. This loss of tongue is no serious affair to the gasteropod, for he finds his tongue growing constantly like a finger-

nail and he needs to work diligently at his trade or suffer from undue proportions of the unruly member. Snails in an aquarium gnaw the green slime from the sides of the vessel with their lingual ribbons, and the process may be seen to more or less advantage at times.

Taste is not all confined to tongues. Some people have papillae on the inside of the cheek. Medusae (Jelly Fish) have no tongues, but the qualities of the sea-water are noted by them. As soon as rain begins to fall into the sea they proceed directly towards the bottom, showing a decided aversion to having their water thinned in any way.

Leeches show their powers of distinguishing tastes when they take in sweetened water quite freely, but suck at the skin of a sick man much less than at that of one in good health.

Taste in insects has its probable seat in many instances in a pair of short horns or feelers back of the antennæ. These are constantly moving over the parts of that which the insect is feeding upon, and so apparently enjoyable is the motion of them that many scientists have concluded that these are the taste organs of the insects having them. At the same time it is quite probable that in all insects furnished with salivary glands, a proboscis, or a tongue, the power of taste is also or exclusively there.

Fishes seem to do most of their tasting somewhere down in the stomach, for they pursue their prey voraciously and frequently swallow it whole. With their gristly gums, in many cases almost of the toughness of leather, there can be but little sensation of taste. Their equally hard tongues, many times fairly bristling with teeth constructed for capturing, but not for chewing, cannot possibly afford much of a taste of what is going down the throat with the rushing water passing through the open mouth and gills.

Serpents which swallow their food alive can get but little taste of their victims as they pass over the tongue, although they are deliberate in the act and cover them with a profusion of saliva.

It is quite possible that cattle in

chewing the cud get the highest enjoyment possible from this sense. They enjoy their food at the first grasp of it, and prove it by their persistence in struggling for certain roots and grasses, but their calm delight afterwards as they lie in the shade and bring up from the recesses of their separate stomachs the choice and somewhat seasoned pellets of their morning's gleanings is an indication of their refined enjoyment of the pleasures of this sense.

Sir John Lubbock calls attention to the remarkable instances of certain insects in which the foods of the perfect insect and of the larvæ are quite different. The mother has to find and select for her offspring food which she would not herself touch. "Thus while butterflies and moths feed on honey, each species selects some particular food plant for the larvæ. Again flies, which also enjoy honey themselves, lay their eggs on putrid meat and other decaying animal substances."

Forel seems to have found that certain insects smell with their antennæ, but do not taste with them. He gave his ants honey mixed with strychnine and morphine. The smell of the honey attracted them and they followed what seemed to be the bidding of their antennæ, but the instant the honey with its medication touched their lips they abandoned the stuff.

Will fed wasps with crystals of sugar till they came regularly for it. Then he substituted grains of alum for the sugar. They came and began their feast as usual, but soon their sense of taste told them there was some mistake and they retired vigorously rubbing their mouth parts to take away the puckering sensation of the alum.

Cigar smokers who really enjoy the weed confess that they cannot tell except by sight when the cigar goes out. In the dark they keep right on draw-

ing air through the cigar, and the pleasure of the smoke seems to be in nowise diminished after the cigar is out unless the smoker discovers he has no light. This seems to show that the sense of taste has little to do with the pleasure of smoking.

Tongues are used in tasting, seizing food, assisting the teeth to chew, covering the food with saliva, swallowing, and talking. Man and the monkey, having hands to grasp food, do not use their tongues for this purpose. The giraffe does so much reaching and straining after food in the branches of trees that his tongue has become by long practice a deft instrument for grasping. The woodpecker uses his tongue as a spear, and the anteater runs his long tongue into the nest of a colony of ants, so as to catch large numbers of the little insects on its sticky surface.

Cats and their kind have a peculiarity in that instead of having cone-shaped papillæ their tongues are covered with sharp spines of great strength. These are used in combing the fur and in scraping bones.

Two characteristic accomplishments of man would not be his if it were not for his versatile tongue; they are spitting and whistling. The drawing of milk in nursing is an act of the tongue, and the power of its muscles as well as the complete control of its movements is an interesting provision of nature. It is believed by some that the pleasures of the taste sense are confined to such animals as suckle their young.

Tongues are rough because the papillæ, which in ordinary skin are hidden beneath the surface, come quite through and stand up like the villi of the digestive canal. The red color of the tongue is due to the fact that the papillæ are so thinly covered that the blood circulating within shows through.



THE MOUNTAIN LION.

THIS is only one of the names by which the puma (*Felis concolor*) is known in the United States.

He has different local names, such as tiger, cougar, catamount and panther, or "painter," as the backwoodsmen entitle him, and silvery lion.

The puma ranges the whole of both the Americas from the Straits of Magellan to where the increasing cold in the north of Canada blocks his passage. Like many other large animals, however, the puma has retired before the advance of civilization, and in many of the more thickly populated portions of the United States a straggler, even, is rarely to be found.

The haunts of the puma depend upon the nature of the country. In sections well-wooded he decidedly prefers forests to plains; but his favorite spots are edges of forests and plains grown with very high grass. He always selects for his abode such spots as afford some shelter, in the vicinity of rocks which have caverns for secure concealment, and in which to bring forth his young. He spends the day sleeping on trees, in bushes, or in the high grass; in the evening and at night he goes forth to hunt. He sometimes covers great distances in a single night, and sportsmen do not always find him near the place where he struck down his prey.

All smaller, weak mammals are his prey—deer, sheep, colts, calves, and small quadrupeds generally. When, however, his prey is so large that it cannot all be devoured at one meal, the animal covers it with leaves or buries it in the earth, returning later to finish his repast. This habit is sometimes taken advantage of by his human enemy, who, poisoning the hidden carcass with strychnine, often manages to secure the lion when he comes back to eat it. The use of poison against these and other carnivorous animals by the farmer and stock-raiser has become so general in the West they are rapidly becoming exterminated. If it were not for some such means of defense as this, the sheep-raisers and cattle-growers would be quite powerless to protect their herds

from the attacks of the mountain lion and other beasts of prey.

The puma is a very bloodthirsty animal, and whether hungry or not, usually attacks every animal, excepting dogs, that comes in his way. When hungry, however, he disdains no sort of food, feeding even upon the porcupine, notwithstanding the quills which lacerate his mouth and face, or the skunk, heedless of that little animal's peculiar venom. Ordinarily the puma will not attack man, fleeing, indeed, from him when surprised, but he has been known when emboldened by hunger to make such attacks. He, of course, sometimes kills the hunter who has wounded him, though even then, by the cautious, he is little feared; but an unprovoked assault, such as the mangling of a woman in Pennsylvania in the eighties, is rare.

It is the habit of the puma to spring upon his prey from an eminence such as a ledge of rocks, a tree, or a slight rise of ground. If he fails to strike his victim, he seldom pursues it for any considerable distance. In northern regions, however, he sometimes pursues the deer when they are almost helpless in the deep snow. When he has seized his victim, he tears open its neck, and laps its blood before he begins to eat. He devours every part of a small animal, but the larger ones he eats only in part—the head, neck, and shoulders—burying the rest.

Very young cubs when captured soon become thoroughly tamed, enjoying the liberty of a house like a dog. When petted they purr like cats and manifest their affection in much the same manner. When displeased they growl, but a roar has never been heard from them. There is one drawback to a tame puma, however, says Brehm. When he has great affection for his master and likes to play with him, he hides at his approach and unexpectedly jumps on him. One can imagine how startling and uncomfortable would be such an ill-timed caress. An old puma, when captured, sometimes rejects all food, preferring starvation to the loss of liberty.

Every movement of the puma is full

of grace and vigor; he is said to make leaps of eighteen feet or more. His sight is keenest in the dusk and by night; his sense of smell is deficient but his hearing is extremely acute.

The lair in which the female brings forth her young is usually in a shallow cavern on the face of some inaccessible cliff or ledge of rocks.

In the southern states, Audubon says, where there are no caves or rocks, the lair of the puma is generally in a very dense thicket or in a canebrake. It is a rude sort of bed of sticks, weeds, leaves and grasses. The number of cubs is from two to five. In captivity two usually are born, but sometimes only one.

THE HOLLY TREE.

O reader! hast thou ever stood to see
The Holly tree?
The eye that contemplates it, well perceives
Its glossy leaves,
Ordered by an intelligence so wise
As might confound the atheist's sophistries.

Below a circling fence its leaves are seen
Wrinkled and keen;
No grazing cattle through their prickly round
Can reach to wound;
But as they grow where nothing is to fear,
Smooth and unarmed the pointless leaves appear.

I love to view these things with curious eyes,
And moralize;
And in this wisdom of the Holly tree
Can emblem see
Wherewith perchance to make a pleasant rhyme,
One which may profit in the after-time.

Thus, though abroad perchance I might appear
Harsh and austere,
To those who on my leisure would intrude
Reserved and rude,
Gentle at home amid my friends I'd be
Like the high leaves upon the Holly tree.

And should my youth, as youth is apt, I know,
Some harshness show,
All vain asperities I day by day
Would wear away,
Till the smooth temper of my age should be
Like the high leaves upon the Holly tree.

And as when all the summer trees are seen
So bright and green,
The Holly leaves a sober hue display
Less bright than they,
But when the bare and wintry woods we see,
What then so cheerful as the Holly tree?

—Robert Southey.

THE LEMON.

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy, Chicago.

THE lemon is the fruit of a small tree from ten to fifteen feet high. It is not particularly beautiful, being rather shrubby in its appearance. It is an evergreen, bearing leaves, flowers, and fruit all the year round. The flowers occur singly in the axils of the leaves. The calyx is persistent, that is, it does not drop off like the corolla, and may be found attached to the base of the fruit. The corolla consists of five spreading petals of a purplish-pink color.

The lemons of the market are from cultivated plants of which there is a large number of varieties. These cultivated varieties or forms took their origin from the wild lemon trees native in northern India, in the mountain forests of the southern Himalayas, in Kumoan, and Sikkim.

Lemons have been known for a long time. They were brought to the notice of the Greeks during the invasion of Alexander the Great into Media where the golden-yellow fruit attracted the attention of the warriors who gave them the name of Median apples (*Mala medica*). Later, Greek warriors also found this fruit in Persia, and hence named it Persian apples (*Mala persica*). The eminent Greek philosopher and naturalist Theophrastus, 390 B. C., described the fruit as inedible, though endowed with a fragrant odor, and having the power to keep away insects. On account of this latter property the so-called Median apple was, by some, supposed to be identical with the fruit of the cedar (*Kedros*) and therefore received the name "*Citrus*" from which is derived "citrone," the German name, and "citronnier," the French name for the fruit. Our word lemon is said to have been derived from the Indian word *limu* and the Arabian word *limun*. It seems that at

the time of the great Roman historian and naturalist, Pliny (23-79 A. D.), the lemon was not yet extensively cultivated. Dioscorides (50 A. D.) speaks highly of the medicinal virtues of the bitter and acrid wild-growing lemon. Cælius Aurelianus recommends lemon juice in gout and fevers. In 150 A. D., the lemon tree, evidently introduced, was found growing about Naples and in Sardinia, but the fruit was still inedible. About the third century cultivation had so far improved the fruit that it could be eaten.

The Arabians are credited with first having introduced the lemon tree into southern Europe. The noted Arabian geographer, Edrisi, twelfth century, describes the lemon as very sour and about the size of an apple and the plant as growing only in India. This latter statement is, however, erroneous as the lemon had already been extensively cultivated in southern and eastern Spain, where it was introduced by the agriculturally-inclined Moors. It has been cultivated for many centuries in nearly all of the countries bordering on the Mediterranean Sea and is now also extensively cultivated in the tropical and sub-tropical countries and islands of the Western Hemisphere. One variety or species, (*Citrus lemetta*), is a native of the East Indies and is extensively cultivated in the West Indies. Lemon trees are found everywhere in the larger green houses and conservatories along with the closely related orange (*Citrus vulgaris*.)

As the result of cultivation there are now about fifty varieties of lemons in existence. Some of these are comparatively sweet or rather insipid and are therefore known as sweet lemons. The sour varieties are, however, more generally cultivated. Lest I forget I will here state that the lemon is not

identical, though closely related, with the Citron, the fruit of the *Citrus medica*.

As above stated the lemon tree bears fruit all the year round so that a number of crops are gathered annually. There are, however, three principal crops collected as follows: The first from July to the middle of September; the second in November; and the third in January. Frequently there are also collections in April and in May. The tree is rather delicate, not as hardy as the orange, for example. In upper Italy it even becomes necessary to cover the trees during the winter months. Lemons intended for shipment are picked before they are fully ripe and packed in barrels or boxes holding from 400 to 700. When exposed the fruit shrinks and loses in weight very rapidly, due to the evaporation of moisture from the pulpy interior. In Italy each lemon is wrapped in tissue paper to protect it against injury and to reduce the evaporation of moisture. Sometimes they are coated with collodion or covered with lead foil to reduce the loss of moisture.

The lemon is put to various uses. The yellow rind contains many minute cavities which are filled with a fixed oil and an ethereal oil to which the fruit owes its fragrant odor. In Italy the oil is obtained in a very crude way. The peel is cut into three longitudinal slices. The workman takes one of these in his right hand, in the left he grasps a small sponge; by pressing the sponge against the outer surface of the rind so that it becomes concave, the oil-bearing sacs are ruptured and the oil absorbed by the sponge. This is repeated until the sponge becomes saturated, when the juice is squeezed into a cup or other vessel. I am very much afraid that the sponge and the hands of the workman are not always clean. I have been informed that an attempt to introduce machinery for extracting the oil was forcibly resisted. It is also

stated that the oil obtained by the "sponge process" is more valuable than that obtained by machinery and distillation. The bitter taste so evident in the lemon is due to *limonin* and *hesperidin*, which occur most abundantly in the rind.

The sour taste of the lemon is due to citric acid, which is found in the large cells forming the pulpy interior. Of course the sap is largely water, about 97.5 per cent., with about 2 per cent. citric acid. The amount of acid varies, however, even rising to 9 or 10 per cent. The juice is easily expressed and is put to various uses. Lemonade is largely consumed on ships, as it is said to prevent ship scurvy. Washing face and hands with diluted lemon juice is said to remove tan and freckles. The beneficial properties of lemon juice, lemonade, in fevers is due to its cooling and refreshing effects, and also to the fact that it acts as a heart sedative, thus tending to lower the temperature. Lemon juice has been highly recommended in acute rheumatism and also to counteract the effects of certain poisons, especially opium.

The essential oil of lemon acts as a stimulant and has been used in diseases of the eye (*ophthalmia*). It also serves to give an agreeable odor to certain medicines, and is used in the manufacture of perfumery and as a flavoring agent for confectionery.

The lemon peel is used in medicine. Candied lemon peel is a confection prepared by boiling the peel in syrup and then allowing the sugar to crystallize.

The following is a description of the excellently colored plate: *A* is a flowering and fruit-bearing twig, nearly natural size; *1* is a single flower, somewhat magnified; *2*, stamens and pistil; *3*, ovary in longitudinal sections; *3a*, ovary in cross section; *4*, anthers; *4a*, pollen-grains; *5*, fruit, nearly natural size; *6*, cross-section of fruit showing rind, large-celled pulp and seeds; *7*, *8*, and *9*, seeds.

ABOUT BEES.

FRED. A. WATT.

THIS subject is an ancient and honorable one. The most ancient historical records make frequent reference to the honey-bee. A poem written 741 B. C., by Eremitus was devoted to bees. In Scripture we read of them and learn that Palestine was "a land flowing with milk and honey" and we know that wild bees are very numerous there even to the present time. In the year 50 B. C., Varro recommended that hives be made out of basket-work, wool, bark, hollow-trees, pottery, reeds, or transparent stone to enable persons to observe the bees at work. The name "Deborah" is from the Hebrew and means bee; "Melissa," from the Greek, has the same meaning.

Honey-bees were introduced into the United States from Europe, in the seventeenth century, and our wild honey-bees are offspring of escaped swarms. Like all enterprising Yankees they first settled in the eastern states and rapidly spread over the West, where they were regarded with wonder by the Indians and called the "white man's fly." They traveled, or spread, with such regularity that some observers claimed to mark the exact number of miles which they traveled westward during each year.

A great many species are almost, or entirely, worthless for domestic purposes, while those that are especially valuable are very few. The favorite at this time seems to be the Italian species, which was introduced into the United States in 1860.

At the opening of the season each colony of honey-bees contains one laying queen, several drones, and from 3,000 to 40,000 workers. The workers begin by cleaning up the hive, and the queen starts in to rear other bees at once; new comb is started, honey is brought in from the earlier varieties of flowers

and the busy bee is launched into another season of sweetness and good works.

The United States Department of Agriculture, in one of its "Farmer's Bulletins," under the heading, "How to Avoid Stings," says, "First, by having gentle bees." At the time I first read this I thought they should have completed the advice by adding "and extract their stings;" but I find on investigation that the subject of gentle bees, is no light matter to the bee-keeper, and that my idea that "a bee is a bee and hence entitled to all the room he requires" does not hold good; that a bee-keeper when purchasing a colony of bees of any species not well known to him will ask if they are gentle in the same tone he would use if he were inquiring about a horse.

Bees seem to do well wherever there are flowers enough to furnish them with food, and are kept for pleasure and profit in all parts of our country. A small plot of ground is devoted to bees by the farmer, a village lot is often filled with hives, and even in our larger cities, especially in New York, Chicago, and Cincinnati, if not in the gardens or on the lawns, they may be found well-established on the house-tops, as many as thirty or forty colonies being found on a single roof. They can usually find enough food in and around a city to keep themselves busy without making long excursions; in fact, it sometimes happens that they find more abundant pasturage in a city than they would in the open country, especially where there are large parks and gardens or where the linden (basswood) trees have been set out in any considerable quantities. Sweet clover also sometimes overruns a neglected garden or vacant lot and furnishes a rich field for the city-bred honey-bee.

In Egypt bees are transported on

hive-boats from place to place along the Nile according to the succession of flowers. The custom also prevails in Persia, Asia Minor and Greece. In Scotland the same method is used while the heather is in bloom and in Poland bees are transferred back and forth between summer pastures and winter quarters.

A few years ago a floating bee house was constructed on the Mississippi river large enough to carry two thousand colonies. It was designed to be towed up the river from Louisiana to Minnesota, keeping pace with the blossoming of the flowers and then drop back down the river to the sunny South before cold weather should set in in the fall. Honey-bee ships have also been talked of which could carry bees to the West Indies to cruise for honey during the winter.

The bee is not fastidious, but will live in any kind of clean box or barrel that may be provided for its use, hence it sometimes lives in queer places. A swarm escaping will generally make its home in a hollow tree or in a fissure of some large rock. The ancient English hives were generally made of baskets of unpeeled willow. Cork hives are in use in some parts of Europe, and earthenware hives are in use in Greece and Turkey. Glass hives are mentioned as far back as the year 1665. In 1792 movable-comb hives were invented and in the century following more than eight hundred patents were granted on hives in the United States.

Bee products form an important item of income in the United States, more than two billion pounds of honey and wax being produced in a single season. When we consider that this appalling amount of sweetness is gathered a drop here and a drop there it leads us to figures too large to be comprehended.

In considering the value of bees we must by no means think of honey as their sole product, as beeswax is an important article. After the honey has been extracted from the comb the latter is mixed with water and boiled down and run into firm yellow cakes, from which the color disappears if exposed for a certain length of time to

the air. Thin slices are exposed until thoroughly bleached, when it is again melted and run into cakes, and is then known as the white wax of commerce. Before oil lamps came into use large quantities of this white wax were used in the manufacture of candles, which made the best light then known, as they burned better than tallow candles and without the smoke or odor which made the tallow article objectionable. The advent of the oil-lamp, the gas jet, and the electric light have practically disposed of its usefulness in that direction, except in devotional exercises, although colored tapers made of white wax are now used for decorative purposes, especially during the holiday season, when numbers of them are used to light our Christmas trees. White wax is also used extensively for making ornamental objects such as models of fruits and flowers. Whole plants are sometimes reproduced and models of various vegetable and animal products are reproduced in colored wax and used for educational or museum purposes. The anatomist finds it of great value in reproducing the normal and diseased structures of the human form. No doubt the original wax works of Mrs. Jarley, made famous by Dickens in "The Old Curiosity Shop," were a collection of wax images made from the product of the honey-bee.

Metheglin is a drink made from honey, and is consumed largely in some parts of the world. It is the nectar which the ancient Scandinavian expected to sip in paradise, using skulls of his enemies as goblets.

The East Indies and the Philippine Islands seem to be under special obligations to astonish the world in everything, and in order to keep pace with their reputations have produced honey-bees of three sizes, one of which is the smallest honey-bee known, and another the largest. The smaller variety is so diminutive that one square inch of comb contains one hundred cells on each side; the entire comb, as it hangs from the twig of a small tree or bush, is only about the size of a man's hand. The workers are a little longer, but somewhat more slender than our com-

mon house-fly, and are blue-black in color, with the exception of the anterior third of the abdomen, which is bright orange.

The giant East Indian honey-bee, which is probably identical with the giant of the Philippines, is the largest known species of the genus. They are about one-third larger than our common bee and build huge combs of very pure wax which are attached to overhanging ledges of rock or to the limbs of large trees. These combs are often five or six feet in length, three or four feet in width and from one and one-half to six inches in thickness. The amount of honey that they gather in the course of a season is enormous and it has been suggested that if introduced into this country they might be of immense value as they would doubtless visit mainly the plants which our honey-bees could not well gather from, such as red-clover, and thus increase the amount of clover seed as well as the quantity of honey already produced. Up to date, however, it is not proven that they will live in hives or that they can live at all in this climate; the latter being regarded as extremely doubtful by some of our best informed bee-men.

Not the least interesting thing in an apiary is the honey extractor, consisting of a large can inside of which a light metal basket is made to revolve by means of a simple gearing. The frames containing the full comb are placed in this basket, the caps being shaved off. After several rapid revolutions the comb is found to be empty and is then returned to the hives to be refilled by the bees.

The queen bee is about one-third larger than the worker and is the mother and monarch of the hive. Queens are sometimes raised by bee-keepers for sale, especially by those who have an improved strain of a certain species, or a new and desirable species of bee. When the bee-keeper gets a mail order for a queen he procures a mailing-cage, which is a small box-like cage covered with wire screen and cloth, in one end of which he places a supply of food, the other end being occupied by a ventilator. The queen and from eight to twelve workers, as royal attendants, are

then placed in the cage, the wire-screen and cloth covers carefully wrapped around them, the address written, a one cent stamp affixed and her royal highness is ready for her trip across a continent, or, with additional postage, around the world.

When, from any cause, the bee-pastures become unproductive bees from different hives often declare war on their neighbors, the strong colonies singling out as enemies those that are weak or disorganized by the loss of a queen. The war is always pursued without quarter and thousands on each side perish in the fray, the victors always carrying off every drop of honey in the hive of the vanquished, leaving the unfortunate survivors of the defeated hive to perish by starvation.

In many parts of England when a member of the family dies someone must tell the bees; this is done by taking the house door-key and rapping thrice on each hive, repeating at the same time the name of the deceased and his station in the family. If this ceremony is omitted the bees will surely die. In some places the hives are draped with a strip of black cloth when a death occurs in the family and with white cloth in case of a wedding. If these ceremonies are omitted the bees are insulted and will leave. Singing a psalm in front of a hive that is not doing well will also set all things right, in some parts of England. I will not attempt to explain how the American bee-keeper rears bees without these ceremonies, but refer the reader to the various hand-books on bee-keeping which will doubtless explain it.

The bees occupy a position in the economy of nature far higher than that of mere honey-gatherers. The service they render in pollenizing the flowers is worth far more to the world than endless stores of honey. There are a number of flowers that are so adjusted that their pollen cannot of itself reach the stigma but is so disposed that it is certain to be carried away by any bee or moth that chances to visit it, while the stigma is so placed that an incoming bee is certain to reach it on first alighting on the flower and dust it with the pollen which has accumulated on the

hairs on the under portion of the bee, or has clung to his legs; this, of course, causes cross-fertilization, a peculiar and wonderful provision of nature, which seems to be necessary for the preservation of fruits and flowers and for the improvement of the different kinds. Whole volumes have been written on this subject, which even now is not entirely understood, but a single case will give a little insight into the matter. The common prinrose will produce even from seeds selected from the same pod, two different kinds of flowers, in about equal proportions, which are sterile of themselves. But each kind may, by means of the good offices of the bee or other honey-loving insect, fertilize the other. If no bees or other insects visit either of these flowers no seed can be produced and the life of the plant ends in a single season. Cross-fertilization is necessary to some plants and beneficial to all. Nature has so devised it and has accordingly made the flowers conspicuous to insects by painting them, in most cases, a different and brighter hue than the foliage of the plant, making the blossom, in some cases, give forth a pleasant odor, and in nearly all cases causing the flower to secrete the nectar which the insects love. Flowers which do not attract the

insects by their bright colors, odor, or nectar, are generally adapted to cross-fertilization by the wind or are partly or wholly fertile in themselves.

It is a pretty well established fact that the flowers which we particularly esteem, the bright-colored, perfumed, nectar-producing varieties, owe their existence to the bees. We also owe the fruits which we love to the selection of the bee to a large extent. Some of the best varieties of strawberries are entirely sterile and must be planted in close proximity to fertilizing varieties in order to bring forth any fruit at all. Some varieties of pears also require fertilization by the bees, and cannot bear fruit if bees are excluded. Even the apple is not perfect unless fertilized by the bees, five distinct pollenizations being required to perfect a single blossom, and in places where orchards do not bear it is often found that the introduction of four or five hives of bees for each one hundred trees will cause them to bring forth fruit in abundance.

So, whether we wear bright flowers, or eat fruit or honey, or stroll through meadows sweet with clover, the handiwork of the bee follows us and impresses us with the fact that our little friend lives only to give us sustenance, sweetness, and pleasure.

BIRDS AS SHEPHERDS.

IN Venezuela there is a species of crane, called by the natives the Yak-a-Mik, which is easily tamed and trained to look after a flock of sheep or take care of the inmates of the poultry yard. When these are placed in charge of this bird it may be implicitly trusted to take them to their feeding places in the morning and bring them safely home at night, not forgetting to hunt for and collect any stragglers. The Yak-a-Mik displays

all the traits of character usually associated with the faithful sheep-dog. It can be amusing, too, for, while its usual gait is slow and sedate, it can execute the most fantastic waltzes and strike all sorts of absurd attitudes. A German agriculturist, Herr von Seyffert, had one of these cranes which took charge of a herd of heifers, driving them to and from their pastures. It also kept order in the poultry yard, stopping all fighting and disorder.



THE MISTLETOE.

WILLIAM K. HIGLEY.

FROM very early times plants, animals, and even minerals have played an important part in the expression of religious ideas and in the execution of religious rites. Among the plants, sacred, and closely allied to the mystic life of a portion of the human race, there is none more interesting and rich in legend than the mistletoe. This was associated with religious observances before the time of Christ and was mentioned by our earliest historians.

There are over seventy species of this peculiar plant. Both the American variety (*Phoradendron flavescens*) and the European, or true mistletoe (*Viscum album*), belong to a family of parasites, so called because they derive their nourishment entirely or in part from some other plant instead of taking it directly from the soil. Owing to the presence of the green coloring matter (*Chlorophyll*), in the stems and leaves, the mistletoe is not entirely parasitic, but is to a certain extent self-supporting, drawing but a portion of its nourishment from the tree on which it grows.

It is found both on deciduous and on evergreen trees. In some locations in Europe it is especially abundant on the apple tree and, if in the right climate, there are few tree species which are exempt from serving as its host.

The mistletoe is an evergreen shrubby plant of slow growth, attaining a length of about four feet and its duration of life is practically that of the tree on which it grows. The leathery leaves and rugged stems are yellowish green in color and, in the axils of the leaves, are the small and insignificant flowers, which ripen about Christmas-tide into pearly white translucent berries. The seeds are probably distributed through the agency of fruit-eating birds which, after eating, wipe their beaks on the trunks and limbs of trees, leaving the

seeds snugly planted in the crevices of the bark.

In Scandinavian mythology we find the mistletoe used to cause the death of one of the favorite gods of the Norsemen, Baldur, the god typifying the beautiful, the good, and the wise. In this myth other friendly gods, fearing Baldur's death, with his mother, exacted an oath from animals, plants and minerals that they would not injure him. Unfortunately, however, the mistletoe was forgotten and Loki, the god of evil, knowing this fact and jealous of Baldur's beauty, gathered a branch, and taking it to Hödur, the blind god of brute strength, directed him how to aim it. Baldur was pierced by the mistletoe and fell to the ground, dead.

But it was in "Merrie England" that the mistletoe was held most sacred, most revered. The Druids, the early priests of the Gauls and Britons, were accustomed to retreat to the oak groves for their mystic rites. The mistletoe was not often found upon the oak, but when discovered, was the occasion of special rejoicing and peculiar ceremonies, being cut with a golden hook, and white bulls were sacrificed under the favored tree. We are told by some authorities that as the oak was the symbol of God, the All-powerful, so the mistletoe became the symbol of man, receiving his life and sustenance from God. There are other interesting myths; and, in fact, the mistletoe is closely woven with many beliefs and rites of the Druids.

At Christmas-tide the mistletoe is largely used for decorative purposes, especially in England, where the custom is ancient, and also in our own land, where each holiday season finds more and more of this unique plant gracing chandelier and window, until we, too, may some day find our maids all kissed—

"Under the mistletoe bough."

THE EAGLE.

Bird of the broad and sweeping wing,
Thy home is high in heaven,
Where wide the storms their banners fling,
And the tempest clouds are driven.

—Percival.

THE bald eagle became the bird of our nation in the year 1873. It is at home in all parts of North America. Its nest in the top of a lofty tree is a common landmark in Maine, and on the great mountain peaks of the western states the nest is usually placed upon the rock where no man nor beast is able to climb.

The American eagle lives in America only, but an eagle living in the Old World looks very much like it. The American bird is larger than the one found in Europe. It is believed that the bird of our country sometimes visits Europe, for an eagle is seen there at times that seems to be our own bald eagle.

The birds that have beaks and claws like those of the eagle are very much like the cat family upon the ground. They are all fierce hunters and live upon weaker animals and birds. The greatest of all the cat family is the lion, the king of beasts. The greatest of the cats of the air is the eagle, and he is called the king of birds.

As the cats have claws and teeth for catching and tearing their prey so the eagles have beaks and talons which are strong and sharp. The cats come quickly upon their prey without the least noise. So do the eagles. They come down from the sky like lightning and nothing is swift enough to get away, unless it is warned of the eagle's coming.

An eagle sometimes lives to be over one hundred years old. Many years ago it was said that an eagle never dies of sickness nor of old age, but that its beak grows out of shape in its last years so that it cannot eat.

All people have admired the eagle. The Indians of America have always liked to wear the feathers of the king of birds, and in Scotland the chief was known by the feather of an eagle which he wore in his bonnet.

It often happens that a young eagle looks much larger than its father or mother. This is because the first feathers of the wings and tail are longer than the ones that grow in their place when the young eagle has once shed them. The young eagle is also darker than the old one. This is why some people have made mistakes in writing about them without knowing a young eagle from an old one.

Eagles of the same kind are not always of the same color. Some are darker than others and the markings are not alike. Some young eagles shed their downy feathers early and wear the dress of grown-up birds. Others keep some or all of their baby feathers five or six years. And there are some very old eagles still wearing some of the downy feathers of their first dresses.

Eagles kept in cages lose some of their fierce ways and change the colors of their dress. But they do not forget that they are eagles. A large cat once went under the bars of an eagle's cage to get the meat which had not been eaten by the bird. Down came the eagle, tore the cat to pieces, and ate him in a hurry.

The bald eagle is very fond of fish. I have seen him on a bright day sailing high above a lake where I was fishing. He was so slow and lazy that I did not think he was fishing too. But when he saw a fine large fish near the top of the water he came down like a flash, struck his claws into the fish, and flew away to his mate in a tree upon the land.

Sometimes the eagle gets the fish hawk to do the work for him. Waiting on the branch of some tree upon the shore he sees the fish hawk flying about over the water looking for his prey. As soon as a fish has been caught and the hawk is coming ashore to eat it, the eagle frightens the hawk so as to make him drop his fish. Then the eagle catches it again before it strikes the water.

It is because he is such a robber that some of the people of America did not like to have him chosen to be the bird of our nation. They felt that we ought to have a bird that is good towards all the other birds.

A poor family once lived for a long time by robbing an eagle. The father climbed to the nest and took away the meat which the eagle brought for its young. Every day he got food for his family from the eagle. When the young birds were almost ready to fly he cut the feathers from their wings so they could not leave the nest. Then he tied them in to make sure of his own meat every day. The young ones cried harder when tied and the old ones thought they were hungry and brought them more flesh.

When the young are old enough to fly the old eagles fly above them as if to show them how easily it is done. If the young do not try to fly when the old ones think it time, they are pushed out of the nest as if to kill them. But the young wings flutter so that the bird does not fall hard, and the old bird flies under her young one to prevent any harm.

The eye of this bird is so keen that it can see a small animal much farther than the animal can see the great bird. When out of sight in the sky the eagle can see a hare as it comes out of its hole. It comes down so fast that it sometimes catches the hare before it can get back to a safe place.

When the sky is clear the eagle flies very high, but on cloudy days he keeps nearer the ground. He likes to fly over waterfalls because fish are to be caught as they pass over the falls. At Niagara Falls eagles are often seen because animals are sometimes carried over the falls by the rushing water, and the birds can get them easily.

The eagle likes to face the sun and fly towards it as if he thought he could reach it. For a long time people wondered how he could face the sun so without being made blind. But we know now that he has a covering for his eyes that keeps them from all harm from the strong light. If you watch a chicken you may see it has two eyelids

for each eye. So has the eagle. The eagle has a sort of eyebrow of feathers that may help protect his eyes from the strong light.

While the eagle is graceful in flying he is not at all so in walking. Few birds are so awkward on their feet. His great claws are made for catching his prey rather than for walking. He can tear things with them and use them in fighting, but he has not much use for them upon the ground.

When they cannot get the food that suits them best eagles will sometimes steal farm animals. Lambs, or even full-grown sheep are easily carried away. They have been known to attack children and carry them off. But they do not often do this, and they have been known to carry them a little way and then set them down again as if the load were too great or they did not wish to eat them.

A story is told of a man who lived a long time ago, and who had but one child, a little girl. He wished to adopt a poor little baby boy, but his wife did not wish to take care of the boy. He had the baby carried to the top of a tree in which was the nest of an eagle. The baby was placed in the nest so he could not fall, and the man and his wife walked under the tree. The child cried so that the lady heard him. She supposed it had been carried there by the bird. Great haste was made to get the baby down, and the lady was so pleased to think she had saved the child from being eaten by the birds that she kept the little one as her own son.

Eagles hunt in pairs. One flies about near the ground to scare the game from the bushes and trees, while the other keeps watch from above to swoop down on the first thing that comes in sight. While their young ones are in the nest the old birds are very active. They are fierce if anyone comes near the young.

Sometimes they show as much cunning in taking their prey as any of the cat family. In flying down to catch animals upon the ground they take care to fly so that their shadow will not frighten their prey. An eagle

(Continued on page 36.)

NUTS.

1. The English walnut (*Inglan-aceæ*) has a thin shell. This nut is much esteemed and is an important article of commerce. It yields by expression a bland fixed oil, which, under the names of "walnut oil" and "nut oil," is much used by painters and is a common article of food.

2. The peanut (*Arachis*) is also called ground nut and earth nut. It is cultivated in all warm regions of the globe, and its usefulness is such that it is likely to extend. It was introduced from Peru into Spain, and thence into France. It succeeds in favorable situations and yields from eighty to one hundred fold. Its cultivation is so general in the eastern parts of Africa, and even in the interior, that doubts have been therefore entertained of its American origin, of which, the most eminent botanists seem to be quite satisfied. The fruit is sometimes eaten raw, but generally boiled or roasted. The importance of the plant is chiefly owing to the fixed oil contained in it, which is used for the same purposes as olive or almond oil.

3. The Brazil nut is the fruit of the *Bertholletia excelsa*, a large tree of the order *Lecythidaceæ*, found chiefly on the Orinoco. The shell is very hard, and contains a rich, oily meat in one piece like an almond. The Portuguese early carried on an extensive trade in these nuts. They are now chiefly imported from Para, and continue to form an article of great commercial importance. When fresh, they are highly esteemed for their rich flavor; but they become rancid in a short time from the great quantity of oil they contain. This has been largely extracted for use in lamps.

4. The hickory nut (*Carya alba*) abounds near the great lakes and in some parts of New Jersey and Pennsylvania. The nuts are in considerable demand and are sometimes exported. The shell is thin, but hard, and the kernel sweet. The oil, which was used

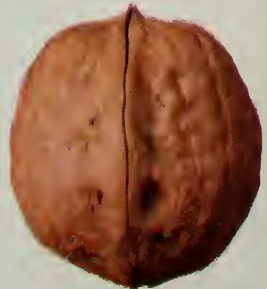
by the Indians as an article of food, was obtained from it by pounding and boiling.

5. The filbert is the fruit of the *Corylus avellana* or hazel. The kernel has a mild, farinaceous, oily taste, agreeable to the palate. In England filberts are usually large hazel nuts. The American hazel nuts are of two other species.

6. The chestnut (*Castanea vesca*) is eaten raw, boiled, or roasted, or is ground into meal and puddings, cakes, and bread are made from it. The tree is common to Europe and America.

7. The pecan (*Carya olivaliformis*), sometimes called the Illinois nut, a species of hickory nut. The shell is thin and the meat well flavored. The tree grows in North America, chiefly in the Mississippi valley, and in Texas, where it is one of the largest of forest trees.

8. The almond (*Amygdalus*) grows on a tree about twenty or thirty feet high, a native of the East and of Africa, but has now become completely wild in the whole south of Europe. It is planted for the sake of its beautiful flowers, which resemble those of the peach in form and color. The wood of the tree is hard and of a reddish color, and is used by cabinet-makers. But it is chiefly valued on account of the kernel of its fruit, well known by the name of almonds, an important article of commerce. It is mentioned in the Old Testament, and appears to have been cultivated from a very early period. It was introduced into Britain as a fruit-tree before the middle of the sixteenth century, but it is only in the most favored situations in the south of England that it ever produces good fruit. It is successfully cultivated in southern California. Almonds are either sweet or bitter. The bitter appear to be the original kind, and the sweet to be an accidental variety, perpetuated and improved by cultivation.



Almond
Chestnut.
Brazil nut.

Life-size.
Filbert
Peanut.

COPYRIGHT 1899, NATURE STUDY PUB. CO., CHICAGO.

Pecan.
Hickory nut.
English Walnut

THE BIRTH OF ATHENA.

BY EMILY C. THOMPSON.

IT IS a study, interesting to some of our modern scholars, to fathom the depths of obscurity and bring up from the hidden past, from the minds of men long departed, their conceptions of the beings whom they worshiped. Still more interesting is it to surmise and conjecture the origin of these marvelous beings. Charming books have been written upon these subjects and they prove fascinating to the reader who, with vivid imagination, can follow the theories of each author and the long fantastic proofs. The gods of the Greeks, those anthropomorphic beings, throbbing with life, radiant with beauty, the ideal of all that is fair and lovely, and yet the prey of human passions and desires, are a never-ending source of delight to classical students.

All theories start from the supposition that the gods had their origin either in physical or mental phenomena. Many try to trace out the effect which the world of nature with its wonders, its beauties, and its fearful realities, has had upon the savage and primitive mind, and how from these impressions arose the main gods of the Greek religion. Of course there are scholars on the other side who will not admit that there is any physical aspect of any of the gods. So the conflict rages, exciting, even absorbing, but inconclusive. The method of proof must depend largely upon the actual remains of that civilization which are still left for us in the literature and art of that people. The Greeks had an established theogony very early, as we know by the "Theogony" of Hesiod, which still remains. In this the parents of the gods were traced far back, to Gaia, the earth, and Uranus, the sky, who themselves were sprung from Chaos. A minute relationship was figured out between all their deities which is to us almost too perplexing to follow. Many names in this theogony are names taken from nature, as those above, and so the scholars get a basis for their investigations.

Athena was one of the principal god-

esses of this race, the virgin goddess of wisdom and of the arts of life, especially honored at Athens, the seat of ancient culture. Could any goddess seem farther removed from anything physical or material?—and yet we find many theories from competent, earnest scholars, brought forward to prove that such a relationship did exist. The birth of this goddess as recorded by the ancient writers was peculiar. At a blow given by Hephæstus (Vulcan) or Prometheus, she sprang from the head of Zeus, the great god of Olympus, clad in her armor, full-grown, and perfect.

A few quotations will tell us the story and show us all upon which the scholars have to base their theories about the origin of the goddess and her nature.

Homer presents Athena to us as the daughter of Zeus, and of Zeus alone, but he does not tell anything about her birth. She seems to be the spoilt darling of her father, or as one German writer calls her, *sein anderes Ich*. She wears the ægis of her father and sometimes all his armor, as she takes an active part in the battles, aiding her beloved Achæans.

Hesiod, Theogony 886-900; 924-926.

"Zeus, the king of the gods, made Metis first his bride—Metis, most knowing of gods and of mortal men. But when she was about to bear the glancing-eyed goddess Athena, then deceiving her mind by craft, by winning words, he swallowed her, by the shrewdness of Gaia and starry Uranus, for thus they advised him, that no other of the ever-living gods might gain kingly honor in place of Zeus. For from her it was decreed that there should spring clever children; first the glancing-eyed maiden, Tritogenia (Athena), having equal strength with her father and wise counsel; but that then she would bear a son, king of gods and men, with overbearing heart. But first Zeus swallowed her, since the goddess purposed both good and evil for him. . . . So he himself bore from

his head the glancing-eyed Athena, terrible, strife-stirring, leader of the host, the unwearied, revered one, whom the din of battle, wars, and combat delights."

Pindar, *Olympian VII*, 33-38.

"Then the golden-haired one (Apollo) spoke from the fragrant shrine of the temple, spoke of the voyage from the Lernaean shores straight to the sea-girt island where the king of the gods, the great one, moistened the city with golden snowflakes, when by the arts of Hephæstus, by his brazen ax, Athena springing down the crest of her father's head, uttered the war cry with a mighty shout, and Heaven and Mother Earth shuddered before her."

Homeric Hymn to Athena XXVIII.

"Of Pallas Athena, honored goddess, I begin to sing, with glancing eyes, of many counsels and kindly heart, revered maiden, savior of cities, valiant, Tritogenia, whom Zeus himself bore from his sacred head, clad in her arms of war, golden, all-radiant. Wonder held all the immortals as they looked upon her. She quickly sprang before ægis-bearing Zeus from his immortal head shaking her sharp spear. And great Olympus trembled terribly beneath the weight of the glancing-eyed one, and the earth about resounded fearfully, and the sea was moved, agitated with its purple waves, and the salt water was poured forth on a sudden. The glorious son of Hyperion (the sun) stopped his swift-footed steeds for a long time until the maiden Pallas Athena took her arms from her immortal shoulders and all-wise Zeus rejoiced.

"So hail to thee, daughter of ægis-bearing Zeus! But of thee and of another song I shall be mindful."

Lucian, *Dialogi Deorum VIII*.

In Lucian's "Dialogues of the Gods" we find the following scene which gives an amusing account of the story in the words of Hephæstus and Zeus.

Hephæstus.—"What must I do, O Zeus? For I have come with my ax, the sharpest one, if it should be necessary to cleave stones at one blow."

Zeus.—"That is good, O Hephæstus, but bring it down and cleave my head in twain."

Heph.—"Are you trying me or are

you insane? Tell me truly what you wish of me."

Zeus.—"This very thing, to cleave my head. If you disobey, not now for the first time will you make trial of my anger. You must strike with your whole heart and not delay for I am tortured by the pains which confuse my brain."

Heph.—"See to it, O Zeus, lest we do some harm, for the ax is sharp and not without bloodshed."

Zeus.—"Only strike quickly, Hephæstus, for I know the consequences."

Heph.—"I am unwilling, but still I shall strike, for what must I do when you bid? What is this? A maiden clad in armor! A great evil, O Zeus, did you have in your head! Naturally were you quick to anger, keeping such a maiden beneath the covering of your brain and armed too. I suppose it has escaped our notice that you had a camp and not a head. She leaps and dances, shakes her shield, brandishes her spear, and is in an ecstasy. And the greatest marvel, she is fair and vigorous—already in this short time. Quick-glancing eyes has she, and a helmet, too, adorns her. Therefore, oh Zeus, as my wages, promise her to me."

Zeus.—"You ask what is impossible, Hephæstus, for a maiden always it is her wish to remain. I, as far as I am concerned, do not gainsay it."

Heph.—"I wanted this. I'll manage it and I'll snatch her away."

Zeus.—"If it is easy for you, do it. Still I know that you ask what is impossible."

A certain Philostratus gives descriptions of paintings which he pretended belonged to a gallery in Naples, and this is one of them: "The Birth of Athena."

"Those astonished ones are the gods and goddesses to whom the order has been given that even the nymphs are not to be absent from heaven, but are to be present with the rivers from which they are sprung. They shudder at Athena, but just now sprung in her arms from the head of Zeus, by the arts of Hephæstus, as the ax shows. No one could imagine the material of her panoply, for as many as are the colors of the rainbow as it changes into different

lights, so many colors flash from her arms. And Hephæstus seems in doubt by what gift he should win the favor of the goddess for his bait is spent since her arms have grown with her.

Zeus gasps with pleasure, as those enduring great pain for great gain, and inquires for his child, proud that he bore her, and Hera is not angry, but rejoices as if she had borne the maiden herself. Now two peoples sacrifice to Athena on two citadels, the Athenians and the Rhodians, land and sea; of the one indeed the sacrifices are without fire and incomplete. Among the Athenians fire is painted and the savor of sacrifices and smoke, as if fragrant and ascending with the savor; therefore, as to the wiser and those sacrificing well, the goddess comes to them. It is said that gold was poured down from heaven for the Rhodians and filled their houses and streets since Zeus poured out a cloud upon them because they, too, revered Athena; and the god Wealth stood upon their acropolis, winged, as if from the clouds and golden from the material in which he appears, and he is painted as having eyes, for from foresight he came to them."

Now that practically all the evidence has been brought it is time to investigate the theories propounded by these modern scholars and the various interpretations which they put upon this strange birth of a deity.

Preller looks upon Athena as the goddess of the clear sky. In the cloudy sky, in the midst of the storm and lightning the clear bright heaven appeared, and this was the birth of Athena. The sky is of the greatest beauty in Greece, especially in Attica, so Athena was most honored in this land.

To another German scholar, Welcker, she is the æther and also the spirit, presenting both sides of the nature of her father, being æther, the daughter of Zeus dwelling in the æther and spirit, the daughter of Zeus the most high spirit. He lays a great deal of stress upon etymologies in his method of proof, deriving the name Athena from æther, but as every author has a different derivation for this name

equally plausible, it is impossible to have full confidence in this gentleman's theory.

Ploix regards Athena as the twilight, and Max Müller brings forward his inevitable "Dawn" as the true solution of the question, but the view which is presented in Roscher's *Lexicon* is perhaps the most sensible of all on this side. Originally Athena was the storm-cloud, and her birth from the head of Zeus shows this, Roscher maintains. This interpretation is evident all through the myth. The clouds appear in different forms, sometimes as the head of Zeus the god of the weather, at other times as the ægis. The lightning is the bright hatchet or glittering lance with which the blow is dealt. The thunder is the terrible war cry. That she was born in the west adds to this evidence, as storms came to the Greeks from that direction.

Farnell contends valiantly in support of his theory that Athena represents no physical force in nature, but wisdom. In antiquity he acknowledges that some philosophers did regard Athena in the other light. Aristotle looked upon her as the moon. The stoic Diogenes Babylonius gave a physical explanation of her birth. He recalls also a comment of a scholiast to Pindar, which tells that Aristocles said that the goddess was concealed in a cloud, and that Zeus, striking the cloud, made the goddess appear. He remarks that philosophers then, in their vagaries, were no better than modern scholars, but that the conceptions which the Greek people and poets had are important for us in reaching a true conclusion; so he endeavors to prove that neither in the accounts of the poets nor in the minds of the Greeks was there any physical conception of the goddess.

In the hymn quoted above he reminds us that there is no thunder which could not be left out if this were the description of a storm. He says also that there is nothing physical in the picture which Pindar gives us, unless the terrible cry of a deity must be taken to mean thunder. Lucian tells of no storm, and Philostratus, who is

so fond of finding remote allusions does not seem to find any indication of a clash of the elements. The only physical feature in his description is the comparison of the panoply of Athena to a rainbow. So Farnell says: "It may be admitted, then, that these poetical descriptions do not consciously express the physical fact. To make them serve the other theories we must regard their highly wrought phrases as mere survivals of an ancient poetical symbolic diction which did more clearly express this." If this were true, would not the earlier accounts preserve this diction for us? But they do not, for this symbolic language is not found in either Homer or Hesiod. He says: "Is it not more natural to say that as imagination dwelt upon her birth the poets tended to embellish it with the richest phraseology, to represent it as a great cosmic incident in which the powers of heaven and earth were concerned?"

His opponents seem to base all their interpretations upon the later accounts, beginning with the Homeric hymn, for this story which Hesiod gives is in the way as there is no phenomenon in the world of nature corresponding to the swallowing of Metis. Metis is Thought or Counsel and is a personification of this abstract idea as Hesiod shows by calling her the most knowing of gods and men. Preller objects to this, and affirms that this primitive language does not deal with abstractions, and that the adjective thus applied to her by Hesiod simply connects her with the water, as there is a sea nymph of that name. But in all the myths which mention Metis, she appears as Thought or Counsel, and it is absurd in a language which personifies grace, righteous indignation, and law not to allow Metis (Thought) to be a similar personification.

Of course the worship of Athena had been long in vogue before a story of her birth arose. So Farnell reasons out the origin of the story thus: In her worship Athena appeared to have abundant thought and counsel, therefore she naturally became the daughter of Thought or Counsel, the daughter of Metis; she had all the powers of Zeus,

therefore she became the daughter of Zeus, and as she had no feminine weakness and inclined to father more than mother, she could not have been born in the ordinary way, and this might have been so if Zeus had followed a fashion common in myth and had swallowed her mother, Metis. The prophecy given in Hesiod as the reason for the swallowing probably arose after the story, as the fulfillment of the prophecy could have been hindered in easier ways, and it is likely that this reason was borrowed from other myths, as, for example, the Cronos story.

The above explanation, Farnell says, is, of course, only a hypothesis, but it has the advantage over the others of being suggested by the most ancient form of the legend and the most ancient ideas concerning the goddess. He adds that the appearance of Prometheus and Hephaestus in later accounts would only strengthen his interpretation, the association of these divine artists with the goddess of wisdom and of the arts of life.

This was a favorite subject with the artists from the earliest times as old vase paintings bear witness. But the famous representation was that in the east pediment of the Parthenon, the work of Phidias. Only fragments of this remain to-day. The central group is entirely lost except for the torso of one god, supposed by some to be Hephaestus, but more probably it is that of Prometheus. So the fragments are of the side groups and not so helpful in recalling the original, but still conjectures and reproductions have been innumerable.

In Madrid a Roman puféal has been found which is believed to present the central group of the east pediment. Upon this Zeus is seated, before him Athena flees away, Victory flies after her to place a crown upon her head and behind Zeus Prometheus with the ax in his hand draws back in fright and turns away. This group of Phidias was, of course, the culmination of this story in art. The later representations are few and supposed to be merely copies of this.

THE WHIPPOORWILL.

WHAT farm boy has not heard this birdless voice echoing from the ghostly shades of the thicket close at hand, or scarcely audible in the distance? Perhaps you have heard it as you have passed between the wood and the hill over there, coming clear from the wood but reëchoing from the hill only the shrill last syllable. Farther away on the distant hill-top you may have taken this last syllable for the piping of the salamander. The "whippoorwill" song belongs with the early May moonlit balmy nights, before the blossoms have lost their best perfume and before farm work has become a mere drudgery.

It vividly recalls the merry May-basketeting frolics, apparently so necessary to existence on the farm; the fresh green fields and woodland blossoms; the planting season with all its hidden promises. There is, in the warble of the bluebird, glad promise of returning spring; and in the animated whistle of the phœbe reiteration of the earlier promise; but the whippoorwill tells of that delightful season realized. His is not a complaint groaned forth, but a glad announcement of joy fully come.

My early home nestled in one of those gems of woodland that dot the rolling Iowa prairies. One of my earliest memories of this old home is the twilight choruses of the whippoorwills in the door-yard. They often ventured upon the door-step and sang for minutes at a time, apparently oblivious of the members of the family seated just inside the open door. On more than one occasion more than one bird occupied the door-step at the same time, all the while apparently trying to drown each others' voices in a continuous flow of song. At such times the delightful mellow-

ness which one hears, with the birds in the distance, gives place to an almost painful, penetrating shrillness. The more deliberately uttered song is invariably preceded by a strongly guttural sound not unlike that produced by striking an inflated rubber bag. The near-by song, to my ear, sounds like "*qui ko wee*," the first syllable with a strong "q" sound. I have never heard them sing later than 11 o'clock in the evening nor earlier than 3 in the morning.

It is well-nigh impossible to creep upon a singing bird in the woods, even if it could be seen in the dim light, but it was not unusual, at my old home, for the birds to playfully fly round and round anyone who might be standing out in the yard at twilight. The birds often came so close that the wings seemed to brush the face. The flight is so utterly noiseless that the object of their sport is aware of the presence before he can fully realize what it is.

The whippoorwill inhabits the eastern portion of the United States, west to eastern North and South Dakota and Nebraska, western Kansas, Indian Territory and Texas; north to southern Canada, into Nova Scotia and Manitoba; and south in winter into eastern Mexico and Guatemala. It breeds in the northern and central parts of its range, and rarely to Florida.

The nest is made late in May or early in June, in the Northern states. The eggs are two in number, light gray or white, with brown and lilac markings often arranged in scratchings and pencilings besides the spots and blotches. There is usually scarcely more of a nest than the leaves lying on the ground; rarely nothing but the bare ground.

THE EAGLE.

(Continued from page 25.)

has been known to destroy an animal too large to be picked up by flying at the animal fiercely as it stood upon the edge of a steep place. The wings of the bird frightened the animal so as to drive it over the cliff to meet death upon the rocks below.

Eagles are sometimes caught by placing a large cage on edge so it will fall when a string is pulled. A live hen and her chickens are tied to the cage so they may run under when the eagle comes at them. As they run into the cage to escape the eagle, he follows them, the string is pulled, and the eagle finds himself alone in the trap, for the hen and her chickens easily get out between the bars which are too close together to allow him to do the same.

An eagle once attacked a weasel. This little animal is very fierce, and will not give up its life easily. Finding itself in the grasp of the bird, the weasel turned and fastened its teeth in the throat of the eagle. It was lucky for the eagle that the weasel did not cut his throat, but the little animal never let go. Its teeth were locked into the flesh of the eagle so they could not be torn open. Years afterwards the eagle was shot, and it had on its neck a queer locket, the skull of the weasel hanging there by the teeth. Sometimes the weasel cuts a vital part in the bird that picks it up, and then the weasel enjoys the life-blood of his enemy.

We have a gold coin that is named after the eagle. It is worth ten dollars. In fact it is ten dollars in gold. The first one was made in 1792. Half-eagles, quarter-eagles, and double-eagles have also been made of gold at our nation's mints.

In some countries besides America it has been the national bird. When the army of Rome first tried to land in England the men feared the fierce English soldiers. One soldier had an Eagle with him in the boat. He jumped into the sea with his eagle and called to his friends to follow him. They soon put the enemy to flight,

and the eagle was praised for helping them win.

The eagle is fond of capturing such birds as the swan. When he finds a swan flying so high that it cannot get to the water and dive out of his reach the eagle flies against the swan from below with such force that the breath is knocked out of the swan in an instant. As the swan falls lifeless to the ground the eagle invites his mate to meet him at the spot and they have a great feast.

The eagle flies swifter than a railway train, but one was once caught by a train before it could rise and get out of the way. The "cannon-ball" train on the Georgia Railway was late. In making up time it swung round a curve in a cut at full speed. A bald eagle was seen on the track by the fireman, who was looking out of the window. The pilot of the engine was upon the bird before he could rise. It struck him, tumbled him upon the frame, and fastened one of his claws into a wooden beam.

Before the eagle had time to get back his senses the fireman climbed along the foot-rail to the pilot. He caught the great bird, and a fierce struggle followed. The bird fought for freedom and the fireman fought for a prize.

The train was going at the rate of forty-five miles an hour. It was hard for the man to keep himself on the engine with one hand on the rail and the other holding the eagle, which tore at him wildly as the engine swung to and fro upon the rails.

The man's clothing was torn to shreds and his hands were bleeding. But he worked his way back to the cab where the engineer assisted him in tying the eagle so he could not get away. But the tying was not easy for two men, for the bird made good use of his great beak and claws.

When spread out on the car floor he measured seven feet from tip to tip of his wings. He was not injured, and is now kept as a splendid prisoner, the king of American birds.

MIGRATORY BIRDS.

IN the New World the birds of the temperate zone are rather perplexing in their migratory habits. Many of those which go north to Canada and Alaska in the summer pass the winter in Mexico, Panama, and even South Columbia; while others, as well as a number of migrants from the United States, go over to the West Indies. One of the most wonderful instances of migration is that of the tiny flame-breasted humming-bird (*Selasphorus rufus*), which breeds on the west coast of America as far north as Alaska and Bering Island, and winters in Lower California and Mexico. Thus, with unerring instinct, this diminutive bird, scarcely two inches long, flies twice a year the astounding distance of over 3,000 miles. The birds which belong to the second class—those which breed in the Arctic regions—comprise the swans, many of the waders, and a considerable number of ducks and geese. In Europe these birds spend the winter in all the countries from England south to the Mediterranean and Black seas, some even going as far south as the upper reaches of the Nile. In Asia most of the waders, such as snipe, woodcock, sandpipers, and plovers, as

well as the ducks and the geese, spend the winter in India and South China. In America the Arctic birds migrate to the Southern United States and Mexico.

The partial migrants, which form the third class, are rather more puzzling in their movements, for among them we find birds whose motives for wandering are very diverse. Some are unwilling slaves—*i. e.*, they get mixed up in the big flights of true migratory birds, and are irresistibly hurried along with them; such are the rooks, starlings, robins, etc., which are so frequently seen in Heligoland in the midst of a flock of swallows, warblers, and other genuine migrants. Another lot of these partial migrants are those which, perhaps, most justly deserve this name; viz., such birds as larks, pipits, titmice, etc., which, although resident with us all the year round, at times greatly diminish in numbers, owing to more than half the individuals changing their abode. For instance, those which breed in Scotland and England wander in the winter over to France, but, unlike the true migrant, always leave some of their number behind.—*Walter Rothschild, The Nineteenth Century.*

HOW BIRDS CARRY SEEDS.

DR. HOWARD, the new secretary of the American Association for the Advancement of Science, writing of the manner in which seeds are carried to a great distance by birds, recited an experiment of Darwin, which had a curi-

ous result. Adhering to the leg of a wounded partridge, Darwin found a ball of earth weighing six and a half ounces. From the seeds contained in this ball he raised thirty-two plants belonging to five distinct species.

THE SHIP OF THE DESERT.

THE pack camel travels very slowly, and until you are sufficiently reconciled to the motion to be able to doze on its back, you are constantly tempted to get off and walk. If you want speed, you must buy a racing camel. This seems to be-

long to a different creation. It is much taller, more alert and more intelligent. It can accomplish 150 miles in sixteen hours without undue effort, and, in the matter of price, compares with the pack camel as the thoroughbred does with the cab horse.

THE SNAPPING-TURTLE.

BY reason of the ferocity of disposition of this curious animal, the snapping-turtle (*Chelydra serpentina*) is rather formidable, not only to the smaller creatures which inhabit the same localities, but also to man, its bite causing very severe wounds. It is found in America from Canada to Ecuador, and there are few localities where it is not met with frequently. Swimmers in small lakes are sometimes attacked by it, the habits of the animal both in the water and on land being the same. It is bold as well as fierce, often suffering itself to be lifted from the ground by the object which it has grasped rather than to let go its hold. If attacked, the reptile's long reach and strong jaws enable it to defeat any ordinary foe. The elongated tail of the snapping-turtle has given rise to the popular name, alligator turtle and, being appended to the small, comparatively thin shell, giving an elongated appearance to the body, the specific name *serpentina* resulted.

When the snapper elevates itself for the attack, with half-open mouth and sullen eyes, there is said to be something fiery and defiant in its attitude, though it is so slow and awkward in recovering itself after missing its point of attack that it presents a most ludicrous appearance. These turtles are remarkably strong. The elder Agassiz states that he observed one bite off a piece of plank more than an inch thick. They also attain considerable size, being the largest inland representative of the order, specimens not infrequently exceeding three feet in length. It is carnivorous in its habits, and is very destructive of fish, small quadrupeds, birds, and reptiles. Many have been the water-fowl which have ventured too close to their voracious enemy. Its appetite is said to be so

great that it will even catch young alligators, and devour them in spite of their teeth and struggles.

The flesh of the snapping-turtle is delicate, tender, and of rich flavor. Every fisherman knows that it will take almost any kind of bait, provided it be of animal substance. It, however, prefers fish, and cannot resist a hook so baited.

In the northern United States, from the tenth to the twentieth of June, it has been observed, the female, at early morning, leaves the water and crawls to a sandbank, digs a small cavity with its hind leg, into which the small, round eggs are deposited to the number of twenty-five or thirty, when the sand is drawn over them, the surface smoothed down, and the animal is soon back in the water, the entire operation not lasting over twenty minutes. This method is different from that of our other land turtles. Nothing but sand will suit the purpose of the snapping-turtle. In order to find a suitable spot for the burial of her eggs, the female is often forced to traverse a considerable distance. The sand must be quite dry and exposed to the full rays of the sun. The little ones are hatched in July. The young run by instinct into the water.

Remarkable stories are told of the longevity of the turtle and of its tenacity of life. That they live to near a century is well authenticated. After the head is severed from the body the head will open and shut the mouth and roll the eyes. In one case a stick was held between the open jaws, which closed upon it with violence, and kept hold of it. Meanwhile the headless body was crawling on the ground.

An allied form (*Matrochelys laceratina*) inhabits the tributaries of the Mexican Gulf, extending northward in the Mississippi as far as Missouri.



THE STORY OF LITTLE BILLEE.

CAROLINE CROWNINSHIELD BASCOM.

IN THE March number of the *Cosmopolitan* of 1894, I read a most interesting article about a tame humming-bird. I know a number of people who enjoyed it as much as I, so I feel sure all lovers of pets, especially of birds, will be interested in my story of "Little Billee." I have always been passionately fond of animals and would like to make pets of them all. I have cared the least for birds, (except out of doors) and have known very little about them.

I have been ill many months, and my family and friends have done all they could to make the days pass as quickly as possible for me. Early in June my mother found a little brown bird which could not have been more than two weeks old. Thinking it might amuse me she brought him up stairs done up in her handkerchief, and I took him inside the bed. After an hour he seemed very happy and not at all afraid. I looked him over carefully, but found him uninjured. I took him to the open window expecting to see him try to fly away, but he did not seem to have the slightest intention of doing so. From that day to this he has been perfectly devoted to me and my constant companion. At this minute he is sitting on the back of my neck dressing his feathers.

The first day I could not get him to eat anything until night, when he drank milk from an after-dinner coffee spoon. After that he took little pieces of bread soaked in milk from my tongue or lip. I fed him in that way for several days, then he would take it out of my fingers. He lived on bread and milk for two weeks. Now he eats almost everything that I do. All kinds of vegetables, mushrooms, and ice cream. He likes to sit on my hand or shoulder and take them from my fork.

I have some kind of nourishment every two hours and Little Billee knows very well when my maid comes into my room with a salver that there is something on it to eat or drink, and he is wild until he gets on my hand or

shoulder. He drinks milk from my tumblers and will not drink water out of anything but my medicine glass. When Little Billee sees me sit down in the morning with an orange on a plate, he flies upon his cage, then over into my lap, and sits on the first finger of my left hand and eats the orange from my spoon. At first he could not crack his own seeds and as he was very fond of them I used to do it for him. Now he can crack them himself, but he prefers eating them outside his cage, and his hemp seed he always brings over and eats on the rug in front of my bed.

Little Billee is very fond of little orange blossom biscuits. I keep some in a tin box under a table by the side of my bed. For several days every time I would reach out of bed and tap on the box Little Billee would come running for a piece. One day I was visiting with a friend and we forgot all about the bird. Soon we heard rap, tap, tap, pop, pop, pop, and there was Little Billee standing by the box waiting for a piece. Since then he comes many times a day. If I send him away with a small piece he returns directly for a large one.

I had quite a time teaching him to stay in his cage. The first day I put him in I was afraid he would die of fright. I left the cage on the floor for two days before he ventured in. After he had been going in and out for some time, I closed the door, but he was frightened quite as much as at first, and he would not go near the cage the rest of the day. Finally I tried taking the cage on my lap and shutting him in; he did not seem afraid then and now he does not mind being shut up in the morning when I am in my dressing-room, but he much prefers going in and out at his own sweet will. If I leave him shut up in his cage and go back to bed, he is frantic until he is let out and gets in the bed with me. For the first two weeks he was not happy if he was not on me somewhere. He would stay in bed with me for hours at a time, but

now he plays on the floor, with a little piece of paper, cotton, or ribbon, and eats his seeds and biscuit.

I dress my hair high and it is Little Billee's special delight to sit on the top of my twist while I walk about my room. During the first few weeks if I put him on the floor when he had been in bed with me, he would hop back and forth on the rug in front of my bed, and beg to be taken, or he would fly straight up. I would put down my hand, he would hop upon my finger and in a second be back inside the bed. If I was sitting in a chair and put him down on the floor, he would climb right up from my feet to my neck, put his little bill in my mouth and chirp with glee. One day he was on the floor and did not see me go back to bed, but saw my wrapper over a chair (which stood about a yard from my bed). He supposed I was inside of it, but when he reached the top and found no mouth to put his bill into, he gave several very mournful peeps, but as soon as I spoke to him he chirped and it did not take him long to fly over to me. The next day when I put him down on the floor I was anxious to see what he would do. After teasing for some time for me to take him, he went to a chair, climbed up on the wrapper until he reached the top, then flew over to me. Ever after he came that way when I refused to take him.

One day I left Little Billee on the rug in front of the bed and went into my dressing room. While I was gone my mother came in and sat down. He was much frightened. Every time she spoke to him he ran under the bed, stuck his little head out from under the valance and peeped for me to come to him. When I spoke he answered, but was too much afraid to pass mother to come to me. When I came out he ran quickly to me and flew onto the back of a very low chair. I bent down and he flew up on my shoulder, chirping as loud as he could. No little child could have shown more joy in getting back to its mother. I do not suppose he remembers any other mother, and thinks all little birds have just such good mothers as I.

I have a magnificent big tiger cat named Taffy, so I thought Little Billee

would be a very good name for my wee bird. It seems a very appropriate name too, as he spends a great deal of his time dressing himself and manicuring his nails. When he struts about with his head held high you can plainly see the long coat, high collar, high hat, and umbrella and can easily imagine the original Little Billee is before you. But I fear Taffy and my Little Billee will never go walking arm and arm together. Taffy has already caught Little Billee twice, but I have rescued him from the jaws of death before any harm was done. I am trying my best to get them to live contentedly together. I do not allow Little Billee to go out into the hall for fear he will fly down stairs and be caught by Taffy before anyone can reach him. Before the door into the hall is a small rug and he thinks flying over that a great feat, but when I say, "Little Billee, come right home," he returns instantly.

He goes to bed at eight o'clock in a little basket which I put on the top of some hanging shelves so there will be no danger from Taffy in the dark. Taffy sleeps on my bed every night, and very often on the outside when Little Billee is inside, and it seems like the lion and the lamb lying down together. Little Billee will usually be contented in his basket until 7 o'clock in the morning, then I take him into the bed with me where he lies quietly on my arm, neck, or palm until I get up at 9 o'clock. He never makes a peep unless I speak to him, then he chirps away like a happy child. On fine evenings I sat before an open window from 7 o'clock until 8 with Little Billee on my finger listening to the birds. When he became sleepy he tucked his little head under his wing, in a few minutes crawled into the palm of my hand and went sound asleep, ready for his basket.

When the hot wave came I went down stairs at 7 o'clock, shutting him up in his cage.

The second night I had hard work to catch him. He ran into the hall and would not come when I called to him. The third night, when he saw me making preparations to dress, he acted like mad. He hopped all around

me, put out his tiny wings, and tried to fly onto me, opened his bill, but not a sound came out. As I stood in front of my dressing table he flew to the top of his cage (which stood on the floor) to the back of a chair (which was near me), then up to my shoulder, chirping away so merrily that I knew he was saying: "Please take me with you." Of course, after that it is needless to say I took him down-stairs, and he has gone down every night since, where he remains until 8 o'clock, then is put into his basket, and I hear no more from him until morning.

On pleasant mornings I sit on the piazza and Little Billee sits on my hand or plays in my lap. When I walk on the sidewalk Little Billee goes, too, and never offers to fly away, and if the wind blows he holds on tight. Sometimes he sings and always seems interested in all that is going on about him.

Twice Little Billee has flown out of my window from fright. Once he was on my shoulder when a very small girl with a very large hat came up to him and away he flew. The next time a large bunch of ferns was brought to me. I thought he would like it and think it was a nice little tree, but I am all the tree he seems to care for. He was so frightened he flew onto a chair, and as I held up a fern out of the window he went. Both times when my maid went to look for him she could not find him until she peeped, then he answered, and she found him sitting in the grass waiting to be picked up, and he was delighted to get back to me.

Little Billee has never gone to any one except my physician, and that was when I had had him about a week. He went to him, hopped all over his shoulder, picked at his collar and tie and was very friendly. Now he will not go to even him, and I feel sure I am Trilby and his only love. Perhaps the children who read this will think Little Billee is a little angel bird and too good to live, but I will say right here he is too bad to die. Like all bright children sometimes he is very naughty. For instance, when I want to lie quietly on my bed in the day time and Little Billee does not, he will play for some time running up on the

top of my pillow, then down again, hop on my arm, then under the sheet until he finds my hand; back he goes and does the same thing over again. When he gets tired of that he will sit on my chin and be very loving, kiss me in the mouth, and chirp away. When he finds I am not going to open my eyes or speak to him he will peck and bite my eyes, nose, ears, cheeks, and lips, and I assure you they are not love bites either. Then again, when he wants to sit on my shoulder and I prefer he should sit on my hand, he will fly up every time I take him down, and bite hard at my hand, and for such a little bird he has a very big bite and a very fierce look.

He loves to visit my mother in her room, and is very happy walking all over her and on her head, but she has never yet been able to touch him. He seems to have eyes all over his head, for, no matter how careful she is, he always sees the finger. He thoroughly enjoys my squeezing him in my hand, and kissing him over and over again.

No doubt long ere this my readers have been wondering what kind of a bird Little Billee is, but that is a question which has not yet been answered. But I love Little Billee so dearly that it makes little difference to me what his nationality is or whether his ancestors came over in the Mayflower, fought in the American revolution, or whether, like Topsy, he "just grewed." It was amusing to see Little Billee the first time he heard the piano. One morning two friends came to see me, and while one of them played I lay on the sofa with Little Billee cuddled up in my neck. At first he was very much afraid and did not know what to make of the music. Soon he became charmed (as everyone does who hears exquisite playing) and craned his little neck way out, opened his bill, as if he were drinking in the sound, then reached around, kissed me in the mouth, snuggled down again, for a few minutes, and repeated it as long as she played.

One morning I saw Little Billee lying on the floor before an open window with his neck stretched out and bill wide opened. I thought he was dying,

picked him up, but found him as lively as ever. When he did the same thing over again I understood he was taking a sun bath, and now he takes one every morning. One morning it was quite cold when we came in from our walk, and I sat down in front of the fire with Little Billee on my knee. It was amusing to see him put his head on one side, open his bill and drink in the warm air. For six weeks he strongly objected to taking a water bath, and I really suppose he was too young and knew best. I left a little dish for several days on the floor by the side of his cage, but he was very careful not to go near it. One morning everything was very quiet, I on my bed and Little Billee playing about the room. Soon he went to the dish, looked in all four corners, came back to the first one, put his bill in just a little way, then went the rounds; did it all over again, putting his bill in a little further, and shaking off the water. After debating a long time he got on the edge of the dish, put his head in until it was all wet, then screwed up all his courage and in he went. Such a droll little figure as he cut, standing there with his body and head held as high as he could get them, his wings out just a little, not knowing what to do next. All I could think of was a very timid child going in wading for the first time, with long thin legs, very short frock, and arms akimbo. His fear soon left him, and he was bathing like an old stager. When he finished he got out, gave himself two or three good shakes, then came over to the bed, and asked me to take him. I did him up in my handkerchief, but that did not suit him at all. I could not do anything with him, until I let him get on my bare neck, and covered him with the trimming of my robe *de nuit*. He was soaking wet and shivering like a person having a hard chill. He kept very still until his feathers were dry enough to be dressed. Such shaking, dressing of feathers, and prinking I never saw. When his toilet was made to suit him he nestled down under my chin, and we both slept for an hour. Every day we go through the same performance after the bath. One

day I wanted to do something in my dressing-room, so thought Little Billee could take his bath and dry himself. Soon I began to hear very mournful peeps, and I came out to find Little Billee, soaking wet, standing in front of my bed, thinking I was there and teasing for me to take him. Of course I could not resist such pleading, so to bed we went. I know I am completely spoiling him, but he is such a dear no one could help it.

Little Billee has taken a great interest in this tale, and when I write is always on my shoulder, arm or hand. His favorite place to sit is on my left hand between my first finger and thumb, as they hold my portfolio on my lap, and peck at my paper and pen. One day he took the pen full of ink into his bill then threw the ink all over my paper. Little Billee has great fun taking the paper off from the bottom of his cage, and carrying it all about the room, and will take it out as fast as I put it in. The other day he went into his cage, took the furthest corner of the paper in his bill, backed out bringing the paper over his head until it was all on the floor, then went over to the opposite corner, took that in his bill, backed off the paper until he came to the end, then went around in a circle like the wind, for perhaps a dozen times, with the paper perfectly straight out just like a sail. After a few moments I put the paper back, he took it right out in the same way and did it all over again.

A number of weeks have passed since I began Little Billee's biography. He grows more wonderful every day, and his devotion to me is simply marvelous. Every day he does some new cunning thing and seems to understand everything I say to him.

The other day he would not come to me when I put down my hand, but ran across the room. After trying for some time to make him mind, I got up and said, "Billee, I am going away and leave you," and started out into the hall. He came chasing after me, and now will always do it when I tell him I am going to leave him. If I go out of my room and tell him he *cannot* go, he will sit on a chair by an open

(Continued on page 48.)



FROM COL. CHI. ACAD. SCIENCES.

SAND-HILL CRANE.
1 6 Life-size.

COPYRIGHT 1899, NATURE STUDY PUB. CO., CHICAGO.

THE SANDHILL CRANE.

THE sandhill crane is so often confused, in the popular mind, with the great blue heron, that it may not be amiss to suggest the real differences between them. We should first remember that the crane is not found east of Illinois, except casually or accidentally, but is numerous from Illinois westward to the western border of the plains during the migrations. It ranges as far north as Manitoba. The great blue heron is pretty evenly distributed over the whole of North America. The cranes usually, if not always, migrate in greater or lesser flocks, alternately circling upward to considerable heights and sailing straight away, with both soaring and flapping motion, and with prodigious croakings. The herons migrate singly or in pairs, with long, steady sweep of the wings, and make no outcry. Close at hand the two species would hardly be confused by an ordinarily careful observer, but these large birds are rarely seen close at hand.

The feeding habits of the two birds are very similar, and to this superficial similarity is largely due the confusion, I suspect. Both wade into the water searching for some hapless frog or toad, often standing motionless for minutes at a time until the victim comes within range of the sharply-pointed beak, when a lightning-like movement of the head sends the beak completely through the creature, killing and capturing it with one stroke. The long legs and neck are admirably adapted to this kind of fishing.

Colonel N. S. Goss describes the

courting antics of these ungainly birds as extremely ludicrous at times. A veritable Indian war dance, in fact, in which the females join heartily, and like the war dance, stopping only when the last participant falls down with exhaustion. It seems to be a sort of promiscuous wedding ceremony for the whole company.

The crane nests on the dry, flat prairie, usually scraping together some wisps of dry grass, but often with not even this poor excuse for a nest. Here two to four drab-brown colored, rough-shelled eggs are laid and the young reared.

Size seems to be the only criterion which determines what the crane may eat. Perhaps it might better be said, what he will swallow. He seems to relish stones, pocket-knives, steel nails and the like fully as well as the choicest bit of frog or toad. Like many other birds, however, he regurgitates the indigestible matter, and so takes no harm from this promiscuous diet. Many of us may have reason to envy him this capacity.

Dr. P. L. Hatch, in his "Birds of Minnesota," gives an interesting description of the fighting qualities of a pet crane which he offered to pit against any and all canines, one at a time. One valiant mastiff, which essayed to do battle with his craneship, entered the ring with all the confidence of an unbroken record of victories, but a moment later he "stayed not on the order of his going," carrying with him the exact pattern of the crane's beak. No other canines ever volunteered for a similar service.

window or play about on the floor for an hour at a time, and never think of flying out of the window or going out of the door.

I have succeeded far beyond my expectations with Taffy and Little Billee. It hurt me very much to be obliged to punish Taffy when he would spring at Little Billee, as Taffy and I had been devoted to each other for two years; still I did not want him to kill my baby bird. One day Little Billee was sitting on my knee dressing his feathers and going through all sorts of antics, while Taffy sat a few feet away gazing at him with longing eyes. I called to my maid to bring Taffy and hold him on her lap, and then let Little Billee peck and bite his paws, ears, and nose, and a more astonished cat I never saw. After we let Taffy go he was found sitting on the cellar stairs in a most dejected way rubbing his nose with his paw. For several days we did the same thing until Taffy was afraid at sight of Little Billee. One morning Taffy came to bed with me, and lay on my arm while Little Billee sat on my shoulder. Soon Taffy put his chin on my chin, and Little Billee came and sat close to my cheek. Finally Taffy became so sleepy he turned over, went fast asleep, and Little Billee hopped down on his back, and we lay that way for some time. Since then almost every day Taffy will lie on my lap, and Little Billee will sit on his head, back, or on my knee and dress his feathers. One day Little Billee had the impertinence, while I had them both on my lap, to reach out and peck Taffy in the eye. That was a little more than Taffy could endure, and he reached out his paw and struck at him. For over a week I could not get Little Billee to go near him, but now they are very good friends.

Little Billee enjoys going down into the parlors to see visitors, but he gives them to understand, the first thing, they may look but they must not touch. He will entertain them by hopping all over me, kissing me in the mouth and chirping at the top of his voice. When it begins to get dark

Little Billee does not want to be off from me a minute. If I have him down stairs and put him on the floor he will hop and fly after me from room to room. The other day I left him in the front parlor on a plant jar and went into the dining-room and was gone some little time. When I came back there was no Little Billee to be found. I called him by name and peeped to him, but I could not get an answer. As I went up stairs I called, "Where is my Little Billee?" And he said, chirp, chirp, chirp; and I found him in my room eating his seeds and as happy as possible.

Since then every day when he gets tired of the parlors he goes up stairs, for he seems to think my room is his home. One day I watched him to see how he went. He hopped from step to step. When he reached the top he flew into my room and lighted on the top of his cage.

Little Billee is certainly not color-blind, for he notices every little change in my dress no matter how slight it is. He had seen me for weeks in only my robe *de nuit*, and wrapper. It was pitiable to see him the first time he saw me gowned in a white skirt and blue waist. I had to lie down when I had finished dressing and Little Billee came over to the bed as usual and asked me to take him. I put down my hand, he hopped on my finger, but when he looked up and saw the blue sleeve away he went as if he had been shot out of a cannon. He tried several times but his courage always failed. At last he gave up and went and sat in a chair across the room, and it was two days before he really liked the change. Next I tried a pink waist with the white skirt, but that seemed even worse to him, which seemed very strange, as he had seen me for days in a pink and white wrapper.

My numerous friends will vouch for the veracity of the story, as they all think Little Billee is the most wonderful bird they have ever seen. I only hope my little sketch, told just as the things have come to me, will give similar pleasure to other invalids.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. V.

FEBRUARY, 1899.

No. 2

GINGER.

Zingiber officinale Roscoe.

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

"And ginger shall be hot i' the mouth, too."

—*Shakespeare, Twelfth Night, II., 3.*

THE well-known spice ginger is the underground stem (*rhizome*) of an herbaceous reed-like plant known as *Zingiber officinale*.

The rhizome is perennial, but the leaf and flower-bearing stems are annual. The stems are from three to six feet high. The leaves of the upper part of the stem are sword-shaped; the lower leaves are rudimentary and sheath-like. The flowers occur in the form of conical spikes borne upon the apex of stems which bear only sheath-like leaves.

The ginger plant is said to be a native of southern Asia, although it is now rarely found growing wild. It is very extensively cultivated in the tropical countries of both hemispheres, particularly in southern China, India, Africa, and Jamaica. The word ginger is said to have been derived from the Greek "Zingiber," which again was derived from the Arabian "Zindschabil," which means the "root from India." It is further stated that the word was derived from Gingi, a country west of Pondecheri where the plant is said to grow wild.

True ginger must not be confounded with "wild ginger," which is a small herbaceous plant (*Asarum canadense*) of the United States. The long, slender rhizomes of *Asarum* have a pungent, aromatic taste similar to ginger. Ac-

cording to popular belief this plant has a peculiar charm. Friends provided with the leaves are enabled to converse with each other, though many miles apart and speaking in the faintest whisper.

The early Greeks and Romans made extensive use of ginger as a spice and as a medicine. During the third century it was apparently a very costly spice, but during the eleventh century it became cheaper, owing to extensive cultivation, and was quite generally used in Europe. Dioscrides and Plinius maintained that this spice was derived chiefly from Arabia. The noted traveler and historian, Marco Polo (1280-1290) is said to have been the first European who saw the wild-growing plant in its home in India. As early as the thirteenth century a considerable number of varieties of ginger were under cultivation, which received distinctive names as Beledi, Colombino, Gebeli, Deli, etc., usually named after the country or locality from which it was obtained.

At the present time Jamaica supplies the United States with nearly all of the ginger, and this island is, therefore, known as "the land of ginger." Cochin-China and Africa also yield much ginger. In Jamaica the process of cultivation is somewhat as follows: During March and April portions of

rhizomes, each bearing an "eye" (bud), are placed in furrows about one foot apart and covered with a few inches of soil. The lazy planter leaves portions of the rhizomes in the soil from year to year so as to avoid the necessity of planting, such ginger being known as "ratoon ginger" in contradistinction to the "plant ginger." The planted ginger soon sprouts, sending up shoots which require much sunlight and rain, both of which are plentiful in Jamaica. The field should be kept free from weeds which is not generally done for several reasons. In the first place pulling the weeds is apt to loosen the soil about the rhizomes which induces the development of "ginger rot," perhaps due to a fungus. Secondly, the Jamaica ginger planter is naturally lazy and does not like to exert himself. The careful planter burns the soil over before planting so as to destroy the seeds of weeds. In brief it may be stated that ginger is planted, tended, and gathered much as potatoes are in the United States. As soon as gathered the rhizomes are freed from dirt, roots, and branches and thrown into a vessel of water preparatory to peeling. Peeling consists in removing the outer coat by means of a narrow-bladed knife. As soon as peeled the rhizomes are again thrown into water and washed. The object of keeping the "roots" in water and washing them frequently is to produce a white article. To this end bleaching by means of burning sulphur and chlorine fumes has been resorted to. Some ginger, especially that of Jamaica, is dusted over with powdered lime; this colors the ginger white very effectively. The bleaching processes also serve to destroy parasites which may infest the ginger before it is thoroughly dried.

The drying or curing of ginger is done in the sun. A piece of ground is leveled and laid with stone and cement. Upon this the rhizomes are spread from day to day for from six to eight

days. At night and during rains they are placed under cover. The small planter does the curing upon mats of sticks, boards, palm or banana leaves raised somewhat above the ground. Very frequently the drying is done upon leaves placed directly upon the ground.

Not by any means all the ginger upon the market is peeled. The Jamaica ginger usually is; the African ginger is usually unpeeled, and hence dark in color; the Chinese ginger is usually partially peeled. Peeling makes the product appear whiter and hastens drying very materially, but much of the ethereal oil and active principle is thereby lost since it occurs most plentifully in the outer coat.

The ginger crop impoverishes the soil very rapidly; every few years a new field must be planted. Forest soil is said to yield the best crops and in Jamaica thousands of acres of forest are annually destroyed by fire to prepare new ginger fields. Ginger appears upon the market either whole or ground. Unfortunately the ground article is oftentimes adulterated; for instance, with sago, tapioca, potato, wheat, and rice starch, with cayenne pepper, mustard, and other substances.

Ginger has been an important commercial and household article ever since the first century of our era. Poets and prose writers of the past and present have praised ginger and the many preparations having ginger in their composition, because of their aromatic pungent taste and stimulating effect. The opening quotation from Shakespeare indicates the properties of ginger. That it was a highly-valued spice during the time of Mandeville (1300-1372) is evident from a quotation from his "travels."

"Be alle that contree growe the gode gyngevere (ginger), and therefore thidre gon the Marchauntes for Spice-rye."

Green ginger pickled in sugar was



highly prized during the middle ages. There are a number of beverages which contain ginger. Gingerade is water charged with carbonic acid gas and flavored with ginger, being almost identical with ginger-pop. Ginger-beer is prepared by fermenting cream-of-tartar, ginger, and sugar with yeast and water. Ginger-ale is supposed to be identical with ginger-beer. These ginger drinks are all refreshing, but I believe my readers will agree that there is usually too much ginger present; the hot, burning sensation in the mouth is not very pleasant. It may be that the trouble lies in taking too much of the drink at a time.

In my estimation ginger as used by the baker is most appreciated and here again I believe my readers will agree with me. Who has not heard of ginger-bread? This sweet cake flavored with ginger is not by any means of recent origin. The great English bard Chaucer sang its praises long ago (1328-1400):

"They fette him first the sweete wyn,
And mede eek in a maselyn,
And roial spicerye
Of *ginge breed* that was full fyn."

Shakespeare also must have valued this bread very highly, for in the play, "Love's Labor Lost," he says:

"An I had but one penny in the world thou shouldst have it to buy *gingerbread*."

Ginger-bread is often made into fanciful shapes. Cats, dogs, horses, elephants, and men are cut out of the rolled dough and then baked. Many of my readers are perhaps familiar with some of the beautiful playtime songs of Alice Riley and Jessie Gaynor. The following are the words of one of these songs, entitled, "The Ginger-bread Man." It describes the ginger-bread man very beautifully in the first verse. His awful fate, evidently in the hands of a small cannibal, is very graphically described in the second verse. I regret being wholly unable

to supply the music. Here are the words by Alice Riley:

"Oh the ginger-bread man, the ginger-bread
man,
The round little, brown little ginger-bread
man,
He has sugary eyes and a sugary nose,
And he's sweet from his crown to his sugary
toes,
Is this dear little, queer little ginger-bread
man,
This dear little ginger-bread man."

"Oh the ginger-bread man, the ginger-bread
man,
The poor little, sad little ginger-bread man,
For he lost his poor arms, and he lost both
his feet,
And he lost his poor head, it was so good to
eat,
And his vest buttons tasted uncommonly
sweet,
Ah, poor little ginger-bread man."

Gingersnaps are very much liked by many. I used to demolish them by the pound until someone whispered in my ear that "bad eggs were used in making them." Since then my appetite for gingersnaps has lessened. I hope what that man said is not true. Gingernut is another cake containing ginger and sweetened with molasses.

At the present time ginger is not very extensively used as a medicine. The powder or tincture is effective in some forms of indigestion. It is used to correct a bad breath, in tooth-ache, as a gargle and mouth-wash, in colic, and in dysentery. In a German work on pharmacy I find that it is recommended in catarrh of the stomach and for "Katzenjammer." It will not be necessary to explain what Katzenjammer means.

Explanation of plate:

A, plant about natural size; 1, flower bud; 2, flower; 3, outer floral parts separated; 4, longitudinal section of flower; 5, nectary with the rudimentary and perfect stamens; 6, pistil and rudimentary stamen; 7, upper end of style with stigma; 8 and 9, ovary in longitudinal and transverse sections.

SAP ACTION.

FRED. A. WATT.

IN order to understand this subject we must first ascertain the conditions under which sap is first produced, what it is, and how it circulates.

To do this we must first know something of the structure of those parts of the tree which serve as channels, or ducts, and those other parts which gather the sap and dispose of the waste after it has completed its mission.

To begin with, the tree is composed of small structures, too small for the naked eye to distinguish. Each structure is, at least for a time, a whole in itself, containing solid, semi-solid, and fluid parts which differ in their chemical nature. These structures are the cells, and when a large number of them are united in close contact they form a cellular tissue through which the sap passes from the roots to the leaves, and from the leaves to the growing parts of the young tree, or shoot.

This cellular tissue is superseded by another tissue which is much stronger and which takes up the work of the cellular tissue, when the tree becomes too large to be supported by the weaker form. It is more solidly formed and is composed of elongated cells which are joined together in a series with their ends overlapping. This is known as woody fiber. The cellular tissue now exists in the tree stem only in the pith, and in the medullary rays which we may see in the grain of any hard wood, radiating from the pith.

With the statement, then, that these tissues form the timber, and that the bark and roots only present a modification of the same structures, we will pass to the tree as we see it with the naked eye.

If we saw the trunk of a tree, of any considerable size, squarely in two, we find three forms which differ in solidity, rigidity, and appearance; namely, the heart-wood, sap-wood, and bark. The heart-wood is the firm, solid wood surrounding the center of the tree, the sap-wood is the softer wood outside

the heart-wood, while the bark forms the skin or outer covering for the whole.

Trees grow from the center outward, hence the present sap-wood will in time become heart-wood and be covered by a new layer of sap-wood, and the present heart-wood is simply sap-wood which has become solidified by the deposit within its tissues of resinous and other matter secreted by the tree. It is now useless for sap-carrying purposes and seems to exercise only the function of supporting the tree in its position. It is through the outer, younger layer or sap-wood that the sap ascends.

Now, if we examine the end of our stick more closely we see a series of rings, clearly marked, circling from the center of the tree and ranging in size from the tiny one which encloses the pith, to the large one which forms the outer surface next to the bark. They are caused by a constant annual deposit and outward growth, by which a layer is added to the outer surface of the sap-wood each season. Hence, by counting these we may determine the age of the tree. Less distinct rings may appear but they will not deceive us as we know that they are caused by a cessation of growth, which may have been caused by drouth.

As a general rule these rings are more distinct in trees inhabiting a climate where vegetation is entirely suspended by the cold after each layer is formed. In warmer regions they are not so distinct. This is especially interesting when we study the fossils of trees which in many cases show a great difference in climatic conditions in the early ages from those we have at the present time.

The layers of bark are much thinner than those of the wood and are not so readily distinguished. They are formed from the interior so that the oldest are on the outside. The older ones fall off, however, so that we cannot trace as many rings in the bark as we can in

the wood, although one is formed in each for every season that the tree lives.

The roots of the tree spread out underground and are the agents through which the tree derives most of the moisture so necessary to its growth. They absorb moisture only at their extremities and usually spread to just such an extent that the water which falls off the outer branches of a tree during a rain, falls exactly where the tender rootlets can gather it up at once and hurry it back up the trunk of the tree. In ground that is springy, or naturally moist, the roots do not depend so much on the rainfall but reach out after moisture wherever it exists in the soil.

Spring seems to give a new impulse to life, especially to vegetable life, which always responds promptly to the genial rays of the sun. During the winter, in our climate, the cells which form our trees are contracted by the cold and when the warm days cause them to resume their natural size, a small vacuum is formed in each cell, which the first warm days proceed to enlarge by thawing only the trunk and branches of the tree, leaving the roots below embedded in frozen soil from which but little moisture can be drawn, while evaporation draws moisture from the trunk and branches with irresistible force. A warm rain now comes, thaws out the soil, and sets the juices therein contained in motion. An immediate rush of sap up the trunk of the tree is the result. It clears out the pores or channels, as a spring freshet clears out the water courses, it rushes into the branches, and the branches rejoice and put on their livery of green; it rushes out through the porous surface of the limbs and rises in the air in the form of vapor, while that which does not escape becomes charged with life and returns down a devious pathway and lays the foundation for another season's growth.

But why should the sap ascend the tree?

This is only one of many questions that the tree will not answer and no one else ever has answered. If we take a strip of blotting-paper and insert one

end of it in an ink-well, the ink immediately begins to climb up the blotting-paper by means of the force known as capillary attraction. Here, says the seeker for truth, is the reason for the ascent of sap, and many profound authors have agreed that he is right. Others claim, however, that he is wrong, while still others think he is only partly wrong and that this force has something to do with it. If we cut the roots from a tree and insert the stem in water we will soon find that this force is not the sole cause for the ascent of sap. Another student has made experiments with the force called diffusion, and claims that this explains the rise of sap to such remarkable heights; but diffusion does not work fast enough and hence must be thrown aside. Another finds that water is imbibed through fine porous substances with great force and that air can thus be compressed to several atmospheres, and this force is affirmed to be the one at work in our trees. But the fact that the amputation of the leaves and branches checks the ascent is brought forward and this theory falls to the ground. The fact that liquid films have a tendency to expand rapidly on wettable surfaces was next advanced, but the objection to the first theory met it at once.

Another interesting theory is now brought forward and has the advantage of practical demonstration, that is, an artificial model was made through which water ascended. It is based on the principle that water will pass through moist films that air will not penetrate, on the fact that evaporation takes place under right conditions with force enough to cause something of a vacuum, and also on the elasticity of the cells.

The model was constructed of glass tubes, closed at one end with a piece of bladder, and joined together in series by means of thick-walled caoutchouc tubing; the top which represented a leaf was a funnel closed by a bladder. This artificial cell chain was filled with water, mixed with carbolic acid to keep the pores from clogging, and was set up with its base immersed. The fluid evaporated through the membrane

at the top of the funnel, which drew up more from the cells below, the space so caused being continually filled from the base. This is an interesting experiment and is said to solve the question, but it is open to the same objection, that a tree will not absorb fluid and carry it for any length of time after the roots are cut off. I regard it, however as a long stride in the right direction.

To what source, then, must we look for an explanation of this process?

I think it is a fact that the small, new root-fibers imbibe fluid with considerable force, but it is undoubtedly a fact that they soon lose this force when deprived of the leaves; that the leaves with the aid of evaporation, exert a

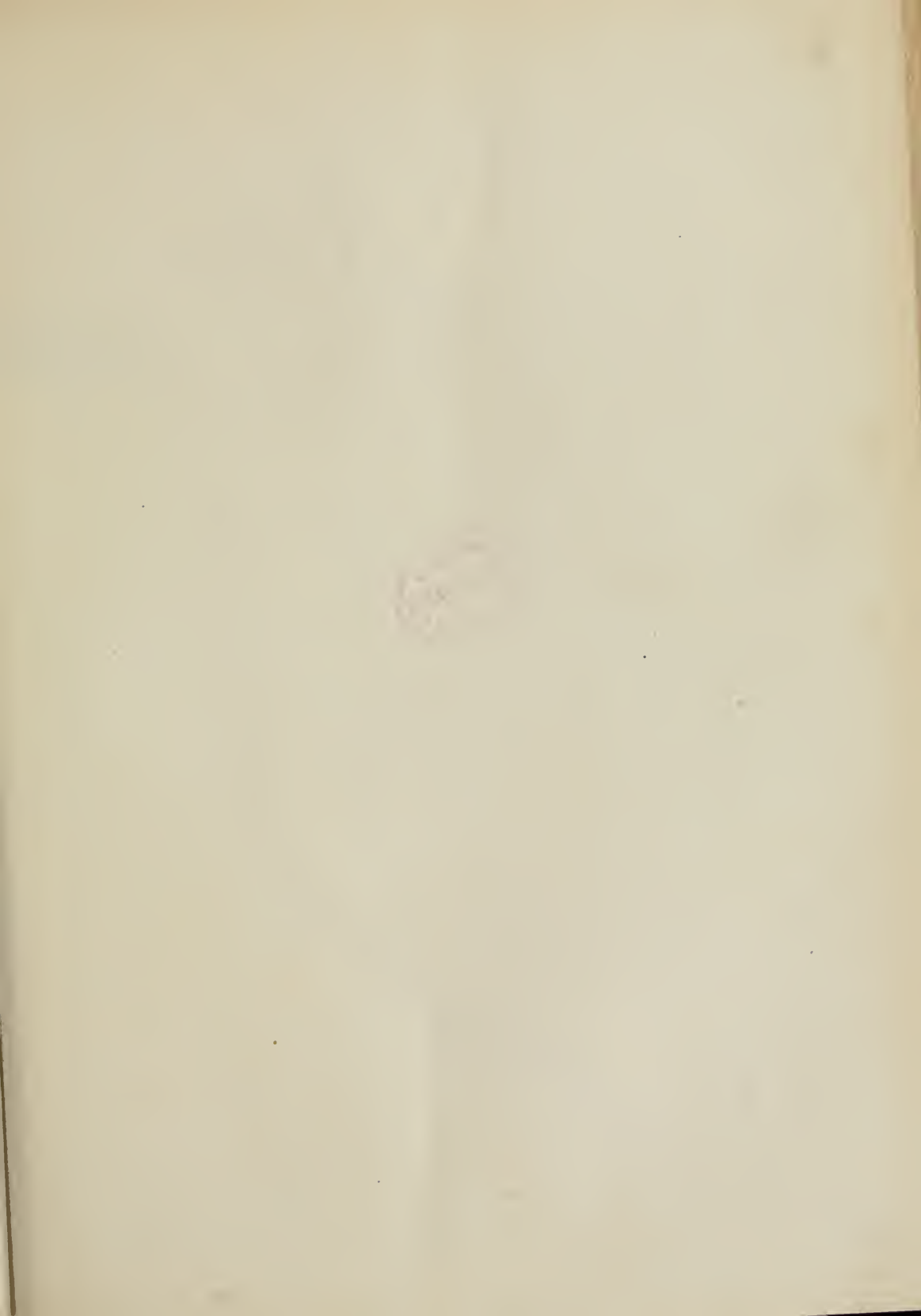
great force, which the above experiment plainly indicates; and I cannot consistently dismiss the idea that capillary attraction has something to do with it. If we also add to this the theory that the swaying of the stems and branches by the wind is continually changing the shape and size of the cells and is thus driving the juices wherever an opening will allow them to travel, thus bringing the elasticity of the tree to our aid, we have again advanced.

But the principle of life is not discovered. Whenever it is we may find it to be a force much greater than any we have so far examined, and which may even cause the overthrow of all theories heretofore advanced.

EMERSON AND THE WOODPECKER STORY.

NO squirrel works harder at his pine-nut harvest than the carpenter woodpeckers in autumn at their acorn harvest, says John Muir in the December *Atlantic*, drilling holes in the thick, corky bark of the yellow pine and incense cedar, in which to store the crop for winter use; a hole for each acorn so nicely adjusted as to size that when the acorn, point foremost, is driven in, it fits so well that it cannot be drawn out without digging around it. Each acorn is thus carefully stored in a dry bin, perfectly protected from the weather, a most laborious method of stowing away a crop, a granary for each kernel. Yet they never seem to weary at the work, but go on so diligently they seem determined that every acorn in the grove shall be saved. They are never seen eating acorns at the time they are storing them, and it is commonly believed that they never eat them or intend to eat them, but that the wise birds store them and protect them solely for the sake of the worms they are supposed to contain. And because these worms are too small for use at the time the acorns drop, they are shut up like lean calves and steers, each in a separate stall, with abundance of food to grow big and fat by the time they will be the most wanted, that is, in winter, when insects are scarce and

stall-fed worms most valuable. So these woodpeckers are supposed to be a sort of cattle-raiser, each with a drove of thousands, rivaling the ants that raise grain and keep herds of plant lice for milk cows. Needless to say, the story is not true, though some naturalists even believe it. When Emerson was in the park, having heard the worm story, and seen the great pines plugged full of acorns, he asked (just to pump me, I suppose): "Why do woodpeckers take the trouble to put acorns into the bark of the trees?" "For the same reason," I replied, "that bees store honey and squirrels nuts." "But they tell me, Mr. Muir, that woodpeckers don't eat acorns." "Yes they do," I said. "I have seen them eating them. During snowstorms they seem to eat little besides acorns. I have repeatedly interrupted them at their meals, and seen the perfectly sound, half-eaten acorns. They eat them in the shell as some people eat eggs." "But what about the worms?" "I suppose," I said, "that when they come to a wormy one they eat both worm and acorn. Anyhow, they eat the sound ones when they can't find anything they like better, and from the time they store them until they are used they guard them, and woe to the squirrel or jay caught stealing."





THE CRAB-EATING OPOSSUM.

THE crab-eating opossum (*Philander philander*) is one of the largest of the family. The body is nine and one-half inches long, and the tail nearly thirteen inches. It has a wide range, extending throughout all of tropical America. It is numerous in the woods of Brazil, preferring the proximity of swamps, which furnish it with crabs. It lives almost exclusively in trees, and descends to the ground only when it wishes to forage.

While it proceeds slowly and awkwardly on the ground, its prehensile tail enables it to climb trees with some facility. This opossum readily entraps smaller mammals, reptiles, and insects, and especially crabs, which are its favorite food. It preys upon birds and their nests, but it also eats fruit, and is said to visit poultry yards and to cause great devastation among chickens and pigeons.

The young of the crab-eating opossum differ in color from the old animals. They are completely naked at birth, but when they are sufficiently developed to leave the pouch, they grow a short, silky fur of a shining nut-brown color, which gradually deepens into the dark brownish-black color of maturity. All observers agree that the little creatures escape from the pouch and, moving around and upon the mother's body, afford a charming spectacle. The pouch is formed by two folds of skin, which are laid over the unformed young attached to the mammae.

The opossum is extensively hunted on account of the havoc it works among poultry.

The negroes are its enemies, and kill it whenever and wherever they can. The flesh is said to be unpalatable to most white persons, for two glands impart a very strong and repellent odor of garlic to it, but the negroes like it, and the flesh repays them for the trouble of the pursuit. The opossum, however, is not easily killed, and resorts to dissimulation when hard pressed, rolls up like a ball, and feigns to be dead. To anyone not acquainted with its habits, the open jaws, the ex-

tended tongue, the dimmed eyes would be ample confirmation of it, but the experienced observer knows that it is only "possuming," and that as soon as the enemy withdraws it will gradually get on its legs and make for the woods.

It is said that the opossum was formerly found in Europe, but now only inhabits America. Nearly all of the species live in the forest or in the underbrush, making their homes in hollow trees, holes in the ground, among thick grass and in bushes. All are nocturnal in their habits and lead a solitary, roving life. The opossum lives with its mate only during the pairing time. It has no fixed habitation. In captivity it is the least interesting of animals. Rolled up and motionless, it lies all day, and only when provoked does it make the slightest movement. It opens its mouth as wide as possible, and for as long a time as one stands before it, as if it suffered from lockjaw.

The opossum can hardly be classed among the game animals of America, yet its pursuit in the South in old plantation days used to afford the staple amusement for the dusky toilers of the cotton states. It was the custom, as often as the late fall days brought with them the ripened fruit and golden grain, for the dark population of the plantation, sometimes accompanied by young "massa," to have a grand 'possum hunt *a la mode*. We would describe the method of taking it, were it the policy of this magazine to show approval of a most cruel practice. Happily the custom, through change of circumstances, has fallen into disuse.

The specimen of this interesting animal which we present in this number of BIRDS AND ALL NATURE was captured, with its mother and five young ones, in a car load of bananas, having traveled all the way from the tropics to Chicago in a crate of the fruit. The mother and young were kept alive by eating the bananas, another proof that the crab-eating opossum does not feed exclusively upon animal food.

WASHINGTON AND LINCOLN.

EMILY C. THOMPSON.

IT is natural that at this time our thoughts should turn toward two of our great national heroes. This month is to us not merely the month of February, marking one of the twelve divisions of our calendar year, but it is a continuous memorial of two of our revered statesmen. We read all we can about our glorified dead, we search the words spoken by them, we visit the places where they toiled for us, and we scan even their homes trying to form a picture of their lives. We do even more. We presume to imagine their thoughts and conjure up the very ideas which might have occurred to them as they stood in these spots now hallowed by memories of them.

It is a fascinating occupation to fathom the characters of truly great men and contemplate their attitude toward various subjects. Sometimes mere conjectures are the fruit of our toil. At other times sure conclusions are reached from facts which are brought to light. Stories galore are told of both Lincoln and Washington, which help us more vividly to picture their natures. The question in which we are interested could easily be answered if we knew these men, but still as we are acquainted with the manifestations of their characteristics we can answer it almost as satisfactorily. Did Lincoln and Washington love nature? Could they appreciate her beauties, and did they evince an interest in her creations?

Lincoln in his log-cabin home, splitting rails, working on the farm, hunting coons, driving the horses and cattle, must have found a glorious opportunity to become acquainted with this great mother of ours. The son of a pioneer who, with his great covered wagon, cattle, family, and household belongings, wanders over the country, whose only neighbors for hundreds of miles are the birds in the woods, the rabbits in the field, and the fish in the stream, the son of such a man certainly sees nature as

few of our city-bred, World's Fair, Paris Exposition young people, can imagine it. Lincoln was content with these, his neighbors. Never do we hear sighs from him and wishes that his lot might be exchanged for that of another, even if his lot was toilsome and lonely. Who can tell but he thus imbibed his love for pure freedom undefiled and his lofty conceptions of this life in its relation to this world and something beyond?

We cannot doubt that the great, tall, clumsy lad had a real love in his heart for the little feathered and furry friends about him, and not simply a love for the beautiful ones, but what is far higher a feeling of sympathy even for the ugly and a genuine tender solicitude for all.

Even when the youth became a man perplexed by business and political problems his nature remained unaltered. Once when a party of his friends on a judicial circuit stopped to water their horses, Lincoln was not there. His companion on the way was asked of his whereabouts. He replied that the last he had seen of Lincoln he was hunting around for a bird's nest, two of the former occupants of which he held in his hand. The wind had blown the tiny nestlings from their snug little home and the greathearted man was trying to find the nest for the wee, helpless chirpers. The same great heart which felt the human cry of pain as keenly as the bewildered cry of the little birds gave its last throb to restore little black nestlings to the warm comfort of free homes protected by law.

There is an amusing incident, told probably as a "good one" upon the politician, but which has more than an amusing side to us. Lincoln was one of a party of ladies and gentlemen, dressed in their best, journeying along a country road. Their attention was arrested by the distressed squealings of a pig. There it was by the roadside, caught in a fence. Of course a general laugh followed. To the astonishment

of all Lincoln, clad as he was, dismounted from his horse and released the poor animal. He could not see even an occupant of the pigsty suffer without feelings of sympathy.

We expect different stories of Washington, a different attitude toward nature and animals, just as the nature of the man was different. Visit Mt. Vernon and at once you feel his relation to the natural world, a love and keen appreciation of the beautiful in nature, with a thorough conviction that where man tampers with the rough beauties of nature a severe orderliness, precision, and care must be manifested.

Seated upon his front veranda, Washington beheld every day a scene of beauty, one gaze at which stays with a stranger for months and for years. The green of his own lawn ending abruptly not far away with the decline of the bluff, the tops of a few trees farther down just visible, and the blue waters of the Potomac bounded in the distance by the bluff of the opposite bank; to the right a carefully mowed lawn sloping away in natural terraces to the bank of the river; to the left a small sward and orchard; behind the house a large green plot. It is to the left of the beautiful, sunny, open space behind the house that the garden is found. Every visitor must spend a few moments there, admiring the hedges, the neatly-trimmed boxtrees, the regular formal designs, and incidentally bidding "Good-day" to the saucy little squirrel who scampers about the paths. It is an interesting spot as revealing what Washington considered the beauty of scenic gardening.

Washington is said to have loved noble horses and to have taken great pride in his stables. He always drove white horses with hoofs painted black. Of dogs, too, he was exceedingly fond and kept an accurate account of the pedigree of every animal belonging to the estate. Usually he drove in a carriage drawn by a span while his family came next in a larger vehicle drawn by four horses. On state occasions he

allowed himself the luxury of an elegant coach and six.

Varied are the feelings with which one views the estate of our first president. It is almost impossible in the midst of all this beauty to realize that it was the same man who enjoyed this peaceful home of luxury and spent that awful winter at Valley Forge or crossed the Delaware amid the floating ice. The quiet restfulness of Mt. Vernon must have been a haven of peace to the valiant soldier who faced the enemy so bravely, to the statesman who toiled so assiduously for his country, and to the heart of human sympathy returning even from the cities of 1776.

At the foot of a gentle slope about midway between the house and the boat-landing is the tomb of the Washington family. The very aged, gray resting-place has been exchanged for one of more modern design. An open vault in front with a protection of iron grating and other chambers extending into the earth form the tomb. It is with awe that the visitor approaches the open vault to gaze upon the gray sarcophagi of George and Martha Washington standing out in bold relief against the dark gray walls and background. Few are the letters sculptured upon the stone caskets, but above in the wall behind them is a square slab bearing the words: "I am the resurrection and the life; he that believeth on me shall not perish but have everlasting life."

It is touching to see the tributes which have been paid to this great man, the trees planted in his honor, the monuments erected to his memory, but none is more touching than the unconscious tribute which nature herself is giving. The tomb is silent and cold. One thinks of the sterner qualities of the dead, when a bit of color catches the eye. There above the sarcophagi in a corner of the inscribed tablet nestle two little yellow birds, a fitting tribute of Mother Nature to her love and trustfulness in one of her noblest sons.

England holds the honor of having first formed societies for the prevention

of cruelty to animals and of having first legislated for its punishment.

THE GEOGRAPHIC TURTLE.

MAP and mud-turtle (*Malaclemmys geographicus*) are the more common names by which this animal is known; and as it is a characteristic species of the waters of Illinois and occurs in countless numbers in lakes, rivers, and flood-ground pools, it may be assumed that most of our readers have met with it. It is exceedingly common in the Illinois and Mississippi rivers, where it is often confounded with quite another species. It is the only species seen by Mr. F. M. Woodruff on the shores of Lake Michigan, whence he has frequently chased it to the water and caught it in his hands. It is timid and inoffensive in disposition, always sliding from bank or log when approached, and even when captured shows none of the ferocity of the snapper. The great strength of its jaws, unsurpassed in massiveness by any of our turtles, would enable it to inflict serious wounds, and it is not a little surprising to find such efficient weapons of offense unaccompanied by special ruggedness of temper. Our streams and lakes, with their numerous sandy shores, and their abundance of animal and vegetable life, would seem to form an ideal habitat for these reptiles. Their food consists ordinarily of fishes, frogs, and mollusks, crayfishes, aquatic insects, and vegetation. They trouble fishermen at times by devouring fishes which they have caught on trot-lines or in set nets. They are not rapid swimmers. An animal once within reach of their jaws must be very quick to escape capture. The eggs are white and are provided with a rather tough shell. They bury their eggs in sand on the shore and leave them to hatch by the sun's heat.

A gentleman who had a pet turtle which he kept in a tank tells some interesting things about its appetite. During the early spring he fed him on

bits of meat, either raw or cooked. Having no teeth, he swallowed these whole, gulping them down with large quantities of water. Outside of his tank he would carry food in his mouth for hours at a time, but apparently was unable to swallow it with his head out of water. He always aimed well, and snapped up bits of meat as carefully and as quickly as if they had been bits of life that might escape him. When a morsel was too large to be swallowed whole, he held it down firmly with his fore feet and pulled bits off with his mouth. His owner once gave him a fish so large that it took him three hours to eat it, and in all that time he never removed his foot. Rival turtles and swift currents had probably taught him this bit of discretion in the days of his freedom. One time he put twenty small fish averaging three inches in length into his tank, thinking this would be a treat for him and would save the trouble of feeding him for some time. A treat he evidently considered it, for within half an hour he had disposed of the entire lot. This excited the admiration of the gentleman's boy friends, and the next day they brought in sixty small fish. At the end of the second day the turtle looked about with an Oliver Twist-like air, which plainly called for more. When there was any perceptible difference in the size of the fish it always ate the largest one first. It ate grasshoppers and dragon-flies, tadpoles, and little frogs—animal food of any kind. It would eat eggs as readily as meat. This voracity of appetite accounts for much of the destruction of young fish life in our lakes and streams, where these turtles are extremely abundant.

In the Philippines, it is said, there lives a turtle that climbs trees. The feet are strongly webbed, and each has three sharp claws.



FROM COL. L. E. DANIELS

GEOGRAPHIC TURTLE.

COPYRIGHT 1899,

NOSES.

W. E. WATT.

THE Rev. Sam Jones says of a trained bird dog that he once saw in the tall grass jumping up to get signals from his master's hand, moving to the right or left, or lying down without a word spoken: "When I saw the faithfulness of that animal in carrying out the wishes of its human master I was ashamed of myself in the presence of the dog."

A hunting dog is busy with eye and ear. Every nerve seems strained to catch the slightest indication of game. But those who know the dog best know he is mainly occupied with his nose. That delicate organ dilates and adjusts itself constantly to every breath of air.

The bird dog knows of the presence of a game bird before he can see it. He scents its location at long range. He is trained to "stand" when he recognizes the scent. With one paw lifted, his nose and tail stretched out to their greatest reach, he points his master to the spot where the game is to be found. At the word of command he moves cautiously forward towards the bird, and when his master is ready another word causes the dog to "flush" the bird, or make it take wing.

The hound upon the track of fox or deer has remarkable power, not only of following the exact track made by the pursued animal, even when some hours have elapsed since the game passed that way, but his scent is so keen that in many instances he is able to tell, when he comes upon such a track, which way the deer or fox was running. Sometimes the hound "takes the back track," but the best dogs are usually so positive in this sense that they make no mistakes as to which way the animal has traveled.

It is common knowledge, but none

the less marvelous, that an ordinary dog is usually able to follow his master by scent alone through the crowded streets of the city or across fields where a thousand fragrant flowers and grasses seem to arise on purpose to baffle him.

This marvelous power is not confined to dogs. Many other animals possess it in a remarkable degree. The keenness of this sense in deer, antelopes, and other wild ruminants is so well known that hunters despair of ever approaching them except from the side which gives them the wind in their faces so that their own peculiar scent may be carried away from the extremely sensitive nostrils of their game. The hippopotamus has this sense highly developed and can discover his human enemy without getting sight of him or hearing his approach.

The polar bear climbs upon an iceberg and sniffs afar the dead whale floating his way, although still miles toward the horizon. The camel in the desert is often saved from death by the keenness and accuracy of his olfactory organs, which tell him the direction he must take to fill his depleted reservoir with water.

The North American Indian smells as keenly as he sees, for he can not only detect the presence of human beings by his nose alone, but also surely tell whether they are of his own or the suspected white race. In the Massachusetts Asylum for the Blind was a mute girl named Julia Brace, who knew her friends and acquaintances by the peculiar odors of their hands. Not being able to see them or converse with them, she was compelled to distinguish them by the sense of smell alone. So remarkable were her

powers that she was regularly employed in assorting the clothes of the pupils as they came from the wash, that operation not being far-reaching enough to remove the signs which were known to her alone. The case of James Mitchell, who was deaf and blind from his birth, is remarkable, for he could detect the approach of a stranger in this way.

Those who have made a thorough study of the subject claim that there is a peculiar odor belonging to every class of living beings, and each is subdivided so that each order, family, species, race, and variety is distinct. Furthermore every individual is distinct from the rest of his kind in the odor given off so profusely and unconsciously in most instances.

Horses seem to be somewhat less keen than dogs in noting odors, for a horse which is accustomed to but one groom and will not consent to attendance from another may sometimes be deceived by having the new groom dress himself in the clothes of his predecessor.

Insects possess this sense to such a degree that flies have been the means of locating a dead rat under a floor by their settling over the body in large numbers, although there was no chance for them to reach it. Just where the organs of smell are in insects has been disputed among scientists. Sir John Lubbock is inclined to the opinion that they are located in the antennæ and palpi, though some contend that insects smell as the air is taken in at the spiracles or breathing-holes which are scattered over their bodies.

That fish have this sense to some extent is attested by fishermen who use essential oils upon their bait and secure readier attention from the inhabitants of the water. But fish seem to be less capable of smell than even the reptiles upon land who are not considered at all remarkable in this respect. To make up in some sort for this deficiency there are some kinds of fish which have four nostrils while all other animals that smell at all seem content with but two as a rule.

Only those animals having a backbone are equipped with noses that are

unquestionably adapted to smelling, but insects, crabs, and mollusks perceive odors to a limited extent. Some of them are readily deceived by odors similar to those they seek. Lubbock calls attention to the fact that the carrion fly will deposit its eggs on any plant that has a smell similar to that of tainted flesh.

We are unable to say just what the nature of a smelling substance is which makes it so perceptible to our olfactory organs. Many things, both organic and inorganic, have the power to affect us in a way which cannot be perceived by the organs of taste nor touch. The upper third of the interior of the human nose has the sole function of recognizing them. We have almost no names for the various smells, but they are as distinct as day and night and arouse within us the most intense feelings.

We are not only without names for smells, but we are far from being agreed as to the qualities of them. To one person the odor of sweet peas is delightful, while to another it is quite the reverse. Sometimes we consider a smell pleasant merely because of the associations it brings. The odor of pine lumber is grateful to one who has spent a season in the lumber districts where sawmills abound; and so the smell of an ordinary lumber pile gives pleasure to one where to another it is somewhat disagreeable.

The sense of smell is one that tires most readily. After smelling certain odors for awhile one loses temporarily the power to notice them at all. The sense does not tire as a whole, but it merely becomes inoperative with respect to the odor continually present. Almost any perfume held to the nose soon loses its charm, and is only effective again after a temporary absence. But while one perfume is not sensed a new one presented to the nostrils is eagerly appreciated, showing the sense to be fatigued only with regard to what has been there for some time. The owner of a large rendering establishment in a city was called upon by a committee of citizens who objected to the smells arising from his plant. He went out with the committee to inspect

the premises and declared with evident honesty that he could detect nothing disagreeable in the air nor any sort of a scent that did not properly belong to a rendering establishment. Those who work where there are strong and disagreeable odors soon become so accustomed to peculiar smells that they do not notice them at all, although they are keen to detect any unusual odor, as when the liquor in a tanner's vat has not in it the proper admixture of materials.

All the lower animals seem to be positive as to the direction of the source of any scent, but man is powerless in the matter. He merely knows an odor is present, but is unable to tell without moving about whether it comes from one side of him or another. A blindfolded boy cannot tell which side of his nose is nearest to a suspended orange.

To affect this sense a substance must be dissolved or scattered through the atmosphere to be breathed. Whether such substances are divided and used up in giving out odors is still a question. Some of them, as the essential oils, waste away when exposed to the air, but a grain of musk remains a grain of musk with undiminished power after years of exposure. The experiment is such a delicate one in connection with the musk that it has never been settled to the satisfaction of science.

Substances which scatter themselves readily through the air are usually odorous, while those which do not are generally without smell. But many of these when transformed into vapors, as by the application of heat, become strongly odorous. Bodies existing naturally in the gaseous state are usually the most penetrating and effective as odors. Sulphuretted and carburetted hydrogen are examples of these.

College boys sometimes procure from the chemical laboratories of their institutions materials which are used with telling effect on the social functions of higher or lower classes; in one instance a banquet was cleared of guests by the conscienceless introduction of chemicals just before the festivities were to have begun. Efforts to introduce powerful gases as weapons in war

have failed because the effect is not confined to the enemy.

Gases which are offensive are not always positively harmful, but as a rule those which offend the nose are to be avoided. Some deadly gases do not affect the sense of smell at all, as in the case of earth damp which stupefies and kills men in mines and wells without warning. But the nose is a great detector of bad air, especially that of a noxious character, and sewer gas as well as other poisonous airs which bring on the worst types of fever are offensive to one who is not living all the time within their range.

But a small part of the mucous membrane of the nose is the seat of this important sense. The olfactory cells are not as easily examined and traced in their connections as are the end organs of the sense of taste. Yet the anatomist finds in the structure of the noses of the flesh-eating animals sufficient indications of their superiority over man in the exercise of the sense of smell. The peculiar development of the membrane and the complicated structure of the nasal cavities in the region occupied by the cells which are supposed to connect with the extreme divisions of the olfactory nerve are all that one would expect from the differences in endowment.

Aside from peculiar powers of smell there are other endowments of noses which are remarkable. The common hog has a snout that is easily moved and has great strength. He can take down a rail fence with it quite as skillfully as a boy would do it. He can turn a furrow in the soil in search of eatable roots, and when the ground is frozen to a considerable degree of hardness he pursues his occupation with unabated zeal and no evident embarrassment.

The fresh-water sturgeon has a large gristle in his nose which boys sometimes convert into a substitute for a rubber ball. His nose is a useful instrument in securing food from the mud in the river bottom. The rhinoceros has a fierce horny protuberance rising from his nose which is valuable to him in war. Indeed some are equipped with two horns, one behind

the other. The female rhinoceros with one horn guides her calf with it, causing him to move ahead of her, but the female of the kind with two horns does not use them upon her offspring at all except in anger, and her calf is content to follow her in feeding.

On the coast of California is a large seal called the sea elephant which is notable because the adult male has a proboscis fifteen inches in length when in ordinary temper, but under excitement it is noticed to extend itself considerably beyond its ordinary length. The shrew, the tapir, and the horse also possess something of a proboscis which is useful in feeding.

But the elephant is the greatest animal as to the development of this organ. Insect-eating animals have snouts of gristle, but the organ of prehension of the elephant is composed almost entirely of muscles of the most varied and curious structure. Cuvier counted twenty thousand muscles in an elephant's trunk, and then gave up his unfinished task.

This great mass of muscular endowment McCloskie says has improved his intelligence which is not so great as is popularly supposed. "Observation shows the elephant after all to be rather a stupid beast; it is the monkey, the fox, and the crow which are credited by the Hindoos with brute-cuteness, whilst the highest measure of rationality evinced by the elephant is when he plucks off the branch of a tree, using it as a whisk to drive off flies that torment him. It seems that he is very much afraid of flies, will take fright at a mouse, and is always timid and suspicious, none of these being traits of a large mind."

The nose has been connected always with the highest emotions of man. As cats are transported into the seventh heaven by the presence of their favorite weed and rats are similarly affected by rhodium, so man carries a perfume in his pocket-handkerchief for his own delectation or that of his friends, and in many instances weaves into his worship certain rites in which the burning of incense and the offering of a sweet savor has a prominent part. The Es-

kimo shows his appreciation of his organ of smell by putting it forward to touch that of his friend whom he meets on terms of special endearment.

Antony Van Corlear's large and rubicund nose is gravely recorded by Irving to have been the means of bringing a great boon to the early inhabitants of New Amsterdam because when he fell asleep in a boat one day, the effulgence of the sun at high meridian fell upon his shining feature, was reflected into the deep with such an undiminished power that the beam came into violent contact with a sturgeon, and, by causing the death of the fish at a time when the Dutch were willing to experiment a little in the matter of gustation, thus introduced the habit of eating this excellent fish to the founders of a great commonwealth.

That the near neighbors of the American Dutch also held the nose in high esteem is attested by the fact that when among the American English any of their divines in one of their interminable sermons came upon a series of unusually great thoughts and carried the congregation into the heights of sacred felicity they acknowledged the divinity of the occasion by "humming him through the nose." Much of their singing also was given an unction otherwise impossible to it by their peculiar nasal attitude while worshiping by use of the psalms.

While the nose is a most prominent feature of the countenance and the beauty of the face depends largely upon that member's appearance, there is no one who can say just what shape the nose should have to be most beautiful. Socrates proved his nose to be handsomer than that of Alcibiades because it was better adapted to use. As the nose is used for smelling and the eye for seeing, Socrates maintained that the handsome eyes and nose of the polished young Greek were less useful and less adapted to the purposes for which such organs exist, and therefore the bulging eyes and violently turned-up nose of the philosopher were held to be more beautiful than those of Alcibiades.



FROM COL. CHI. ACAD. SCIENCES.

WHITE IBIS.
 $\frac{3}{10}$ Life-size.

CHICAGO COLORTYPE CO.,

COPYRIGHT 1899
NATURE STUDY PUB. CO., CHICAGO.

THE WHITE IBIS.

(*Guara alba.*)

LYNDS JONES.

THE white ibis might well serve as the text of a symposium upon the evils of plume-hunting to supply the constant demand of the millinery trade. Suffice it to say here that this species, in common with many other members of its family, and many other birds as well, has decreased to the point of almost complete extermination within the last fifteen years from this cause alone. Surely it must be true that the living bird in its natural environment is far more pleasing to the æsthetic sense than the few feathers which are retained and put to an unnatural use.

As lately as 1880 the white ibis was decidedly numerous in the various rookeries of the southern states, wandering as far north as the Ohio river, and touching southern Indiana and southern Illinois. Two were seen as far north as southern South Dakota. They are now scarcely common even in the most favored localities in Louisiana and Texas, being confined to the gulf states almost entirely, and even there greatly restricted locally.

Like many of their near relatives, the herons, the ibises not only roost together in rookeries, but they also nest in greater or less communities. Before their ranks were so painfully thinned by the plume-hunters, these nesting communities contained hundreds and even thousands of individuals. But now only small companies can be found in out-of-the-way places.

The nest is built upon the mangrove bushes or upon the broken reeds and rushes in the swamps, and is said to be rather more carefully and compactly built than are the herons' nests. The eggs are three or four, rarely five in number, and are laid about May 1 in

many localities, later in others. They appear large for the bird. In shape they are usually rather long ovate, and in color are gray or ashy-blue, irregularly and rather heavily blotched and spotted with reddish and umber browns of various shades. Some specimens are very pretty.

The story of their great abundance, persecution, rapid decline, and almost death, if written, would read like some horrible nightmare. Confident in the apparent security of their ancestral gathering-places, they fell an easy prey to the avaricious plume-hunter who, from some vantage-point, used his almost noiseless light rifle or air-gun with deadly effect, tallying his victims by the hundred daily. We are sometimes led to wonder if there is anything so sacred as money.

We might be able to derive some comfort from the thinning ranks of many of our birds, perhaps, if we could be sure that when these were gone the work of extermination would cease. But when one species disappears another, less attractive before, will be set upon, and thus the crusade, once begun, will finally extend to each in turn. This is not theory but fact. Nor will the work of extermination cease with the demand for plumes. Not until repeated refusals of offered plumes have impressed upon the mind of the hunter the utter futility of further activity in this line will he seek some other occupation. It is a shame upon us that killing birds should ever have become an occupation of anyone. A strong public sentiment against feather adornments will yet save from destruction many of our native birds. Can we not arouse it?

THE HELPLESS.

ELANORA KINSLEY MARBLE.

AS the nesting-season of our feathered friends approaches the mind naturally reverts to the grief in store for so many of them. Notwithstanding the efforts of the several Audubon societies, the humane journals, and in rare instances earnest pleas from the pulpit, fashion decrees that the wearing of bird plumage, and the birds themselves, is still *de rigueur* among women. The past season, certainly, showed no diminution of this barbarous fashion—a humiliating thing to record—and so the beautiful creatures will continue to be slaughtered, not by hundreds or thousands, but by millions upon millions, all for the gratification of woman's vanity and a senseless love of display.

Alas, that the "fair" sex in whom the quality of mercy is supposed to exist in a high degree, should still wear above their serene brows—often bowed in worship—the badge of inhumanity and heartlessness. That mothers who have experienced all the pangs as well as joys of motherhood can aid in breaking up thousands of woodland homes by wearing the plumage which makes the slaughter of these birds one of commercial value and necessity. Soon accounts will be published of the fabulous sums to be gained by the heron hunters, and in order to supply the demand for the filmy, delicate *aigrette* to adorn my lady's bonnet, the nesting colony of these snowy egrets will be visited by the plume-hunters and the work of slaughter begin. Love and anxiety for their nestlings will render them heedless of danger, and through all the days of carnage which follow, not one parent bird will desert its nest. Fortunately the birds are instantly killed by the bullet, else, stripped of the coveted plumes they will be thrown in a heap, there slowly to die within sight and hearing of their starving, pleading little ones. These have no value for the plume-hunter, and so off he goes with his spoil, leaving thousands of orphaned

nestlings to a painful, lingering death. And all this for a plume, which, in these days of enlightenment marks the wearer either as a person of little education, or totally lacking in refinement of feeling. It is trite to say that motherhood no more than womanhood necessarily implies refinement in the individual, but surely in the former, one would, in the nature of things, expect to find engendered a feeling of tender pity for any helpless animal and its offspring.

It is this phase of the question which particularly appeals to people in whom love, as well as compassion for *all* helpless creatures is strong, not a sentiment newly awakened, or adopted as a fad. That genuine love for animals is inherent and not a matter of education the close observer, I think, will admit. Not that a child cannot be brought to recognize, when caught in any act of cruelty to some defenseless creature, the wanton wickedness of his act, but that no amount of suasion can influence him to treat it with kindness for *love's* sake rather than from the abstract moral reason that it is right.

How can this love for animals exist in a child who has never known the joy of possessing a household pet? In whose presence an intrusive dog or cat is ever met with a blow, or angry command to "get out?" When somebody's lost pet comes whining at the door, piteously pleading for a kindly pat, and a morsel to eat, and is greeted with a kick, or possibly a bullet, under the pretense that the exhausted, panting little animal might go mad? How can a child who has witnessed these things view a suffering animal with any other feeling but calm indifference, or a brutal desire to inflict upon it additional pain? In his estimation every dog is subject to rabies, and every cat infested with fleas.

Paternal apathy in this direction may, to some extent, be remedied by the child's instructors, especially in the kindergarten, where the foundation of character is supposed to be laid. But

even there the teacher will fail in arousing a feeling of compassion in a naturally cruel child's mind, unless her own sympathies are genuine, and not assumed for the time or place. Here more than anywhere else, it seems to me, intelligence, if not love, should prompt the teacher to familiarize herself with the treatment necessary not only to the well-being but to the happiness of the little captives held for the purpose of nature-study in her class.

As spring opens, thousands of would-be naturalists, stimulated by nature-study in schools, will, no doubt, begin their universal search for birds' eggs, not from any particular interest in science, but as they collect stamps or marbles, simply to see how many they can get. In this way millions of birds are destroyed with no thought beyond the transitory triumph and pleasure of getting them. This egg-collecting should not be encouraged by the teachers. On the contrary every boy should be told that a *true* naturalist does not slaughter animals, or rob birds' nests promiscuously; that he is the first to remonstrate against wanton waste of life; that he does not take eggs of common birds at all, and never *empties* a nest unless of a rare bird, and sometimes not always then. These arguments will prevail among a few who have the real naturalist's instinct, but to the many who either do not know, or do not care, about the cruelty they inflict upon the parent birds in thus robbing them of their treasures, another appeal must be made. Picture the family life of the innocent little creatures—a lesson indeed to people of

larger growth; how they guard their nests with almost human care and wisdom, and how they cherish their young with as faithful and self-sacrificing love as parents of human families. Impress upon their young minds how many days of toil the mother-bird, aided by her mate, spent in building the nest which they purpose to rifle, of her joy and pride when the first egg was deposited, and all the patiently borne days of brooding which followed. Surely a boy not wholly depraved would be moved by such a recital, and thus thousands of birds be saved, and through their influence, protected. In this way, too, might not the whole question of slaughtering birds for millinery purposes be solved, for what mother or sister could turn a deaf ear to the reproaches of a child, or to pleadings from young lips for more humane treatment of their feathered friends?

That the small boy is not without wit, and quick to perceive the difference between precept and practice, the following anecdote, I think, will aptly prove:

She was smartly dressed, and when she met one of her scholars bearing off a nest in which were five pretty little speckled eggs, she did not hesitate to stop him.

"You are a wicked boy," she exclaimed indignantly. "How could you rob the birds of their nest? No doubt, at this very minute, the poor mother is hovering about the tree grieving for the loss of the eggs which you carry."

"*Oh, she don't care,*" replied the urchin, edging off with a derisive smile, "*she's on your hat.*"

FEBRUARY.

The old, old wonder of the lengthening days
 Is with us once again; the winter's sun,
 Slow sinking to the west when day is done,
 Each eve a little longer with us stays,
 And cheers the snowy landscape with his rays:
 Nor do we notice what he has begun
 Until a month or more of days have run,
 When we exclaim: "How long the light delays!"
 So let some kindly deed, however slight,
 Be daily done by us, that to the waste
 Of selfishness some light it may impart—
 Mayhap not noticed till we feel the night
 Is less within our souls, and broader-spaced
 Has grown the cheerful sunshine of the heart.

—*Samuel Francis Batchelder.*

THE IRIS.

IN botany this is the generic name of a number of beautiful plants belonging to the natural order of *Iridaceæ*. The plants have a creeping rootstock, or else a flat tuber, equitant leaves, irregular flowers, and three stamens. They are represented equally in the temperate and hotter regions of the globe. The wild species of iris are generally called blue-flag, and the cultivated flower-de-luce, from the French *fleur de Louis*, it having been the device of Louis VII. of France. Our commonest blue-flag, *iris versicolor*, is a widely distributed plant, its violet-blue flowers, as may be seen, upon stems one to three feet high, being conspicuous in wet places in early summer. The root of this possesses cathartic and diuretic properties, and is used by some medical practitioners. The slender blue-flag found in similar localities near the Atlantic coast, is smaller in all its parts. A yellowish or reddish-brown species, resembling the first named in appearance, is found in Illinois and southward. There are three native species which grow only about six inches high and have blue flowers. They are found in Virginia and southward, and on the shores of the great lakes; these are sometimes seen as garden plants. The orris root of commerce is the product

of *Iris Florentina*, *I. pallida*, and *I. Germanica*, which grow wild in the south of Europe; the rhizomes are pared and dried, and exported from Trieste and Leghorn, chiefly for the use of perfumers; they have the odor of violets. The garden species of iris are numerous, and by crossing have produced a great many known only by garden names. The dwarf iris, *I. pumila*, from three to six inches high, flowers very early and makes good edgings to borders; the common flower-de-luce of the gardens is *I. Germanica*; the elder-scented flower-de-luce is *I. sambucina*. These and many others are hardy in our climate, and readily multiplied by division of their rootstocks. The mourning or crape iris is one of the finest of the genus, its flowers being very large, dotted and striped with purple on a gray ground. The flowers of most of the species are beautiful. Some of them have received much attention from florists, particularly the Spanish, English, and German, or common iris, all corn-rooted species, and all European. The Persian iris is delightfully fragrant. The roots of all these species are annually exported in considerable quantities from Holland. The roasted seeds of one species have been used as a substitute for coffee.

THE LANGUAGE OF FLOWERS.

THE language of flowers is a study at once interesting and innocent, cultivating, as it does, a taste for the works of nature, filling the soul with the sweetest emotions and presenting to view one of the most enchanting phases of a beautiful world full of wonders. Following are a few of the best-known flowers and the sentiments which they represent:

Sweet alyssum, worth beyond beauty; apple blossom, preference; bachelor's button, single and selfish; balm, sympathy; barberry, sourness; candytuft,

indifference; carnation pink, woman's love; Chinese chrysanthemum, cheerfulness under misfortune; clematis, mental beauty; columbine, folly; red clover, industry; dahlia, dignity; white daisy, innocence; faded leaves, melancholy; forget-me-not, remembrance; jonquil, affection returned; lily of the valley, return of happiness; myrtle, love in absence; pansy, you occupy my thoughts; moss rose, superior merit; red rose, beauty; white rose, I am worthy of love; sunflower, haughtiness; yellow rose, infidelity.



IRIS.



THE PEACOCK.

ANNA R. HENDERSON.

AS THE rose among flowers, so is the peacock among the feathered tribes.

No other bird has so many colors in its plumage. Its hues are all beautiful; the brilliant blue and black, shot with gold, of the eyes of the tail, the satin-like peacock blue of its neck and breast, the shining green of its back, each feather with its tiny eye of brown, the clear brown of the stiff fan that supports its tail, the soft gray down that clothes its body—all are fit robing for this royal bird.

In keeping with his kingly raiment is his regal movement; so graceful, so dignified, that one seems disposed to believe the legend of India, his native home, that he contains the metamorphosed spirit of a peerless prince. I have said that his step is kingly, yet I am often disposed to yield to the opinion of an old man who declared that the gait of the peacock is queenly, much like that of a beautiful and graceful woman with a long train. Certain it is, that nothing else can make such an addition to a green lawn as a peacock, stepping lightly along, keeping his brilliant feathers swaying just above the grass.

My West Virginia home has many beauties of nature, shady dells where waters sparkle, pastures that slope toward the shining Ohio, lofty trees that give shade to sleek cattle and spirited horses; but amid all these charms we have always rated highly the gorgeous peacocks which have so long adorned its grounds that it has become known as the "Home of the Peacocks." Though now sadly diminished by poachers and hunters, there were many years in which scores of them, sometimes nearly a hundred, strutted around our rural home.

The peacock's tail does not assume full length and beauty until his fourth or fifth year. The feathers begin to grow in January, and by early spring are long, and then his season of strutting begins; and he spends a large part of every day in this proud employment. Each peacock has his favorite place of

strutting, and frequents it day after day. Open gateposts are much sought after; and our front gateposts have always been favorite resting-places on sunny afternoons, where these beauties seemed posing to order.

For many seasons a very handsome one strutted in front of our sitting-room window. Some of the family slipped over its neck a cord on which hung a silver dime, which shone on its blue feathers. Alas for his majesty! Strutting in the road one day, a horse shied at him, and its owner threw a stone and killed the beauty.

The peahen, a meek-looking matron with a green neck and long gray feathers, is very secretive as to a nest, and seeks an orchard or wheatfield. When the little gray brood, from three to five in number, are a few weeks old she brings them to the yard.

Peafowls scorn the shelter of a house and roost in the loftiest trees. Near our home are some tall oaks and under them they gather on summer evenings, and, after many shrill good-night cries, fly upward to the high limbs.

In cold weather they do not come down until late in the day. Sometimes on snowy days they get so weighted with snow that they cannot fly up, and so settle on the ground, and their long feathers freezing, have to be cut loose. In June or early July their feathers begin to drop, and to secure them they must be plucked. Though so docile as to frequent the porches, they do not like to be caught, but take to the wing, so a rainy day is selected, when their feathers are weighted with water, and they are soon chased down. After being plucked they are unsteady in gait and hide in the bushes for days.

Peafowls have a strong home-feeling and when taken away are hard to retain; as they wander off, striving to return. They are enemies to young chickens, and are exasperating to the good housewife, as they are hard to drive away, performing a circle and returning. The peafowl is almost as good a table fowl as the turkey.

OWLS.

JOHN WINTHROP SCOTT.

BIRDS that fly in the night and whose wings move so smoothly through the air that they make no noise act much like the burglar that gets into your house quietly when you are asleep to steal your money. But the owl is not a burglar. He is the friend of man. There is no other bird that does the farmer so much good as the owl. The owl comes out in the dark to get the small animals that are out at that time stealing things from the farmer. So we may call the owl the night watchman of the farm. He sometimes comes out in the daytime, but most owls prefer the night or at least a dark day.

The owl has been called a wise bird for the same reason that some men are thought to be wise—he looks wise. One reason he looks so steadily at you that you think he is studying you is because the light is so strong in the daytime that his sight is bad. But the owl is not as wise as he is said to be. He does some foolish things as well as other birds. In fact he is sometimes more foolish than any other bird would be in the same place. One owl was known to sit for more than a half day under a leaking water tap. The water fell at the rate of twenty drops a minute right down upon the owl's head, and yet he was not wise enough to move out of the wet.

All owls are not too stupid to learn. Puffy, a tame young owl, caught and ate a two-pound pullet. An old hen afterwards took a fancy to his perch. She went in and gave the little owl a sound whipping, and after that shared the perch with him. He never forgot the lesson the hen had given him and always treated her well.

Owls have a way of hiding from notice by making believe they are something besides owls. They can move their feathers so as to change their looks entirely. The great horned owl sometimes makes himself a frightful mass of feathers a yard wide, and

at other times he seems to be a very slim bird, too thin for an owl. Puffy once got away from his master. He flew to the top of a stump and sat like a stake for an hour while his master looked all round the place for him without knowing there was a bird on the stump in plain sight. Owls draw the feathers away from their mouths in an odd way when they eat, and when walking softly to steal upon a mouse tuck up their feathers as a lady lifts her skirts.

Owls are fond of mice. A boy who had a half-grown barn owl tried him one day to see how many mice he would eat. The first four mice went down the owl's throat very quickly. Then number five and number six were eaten in a short time. Number seven did not go down quite as rapidly and number eight was slower still. Number nine was taken greedily, but the owl could not swallow it. The tail hung out of the owl's mouth for awhile before it could be fairly counted. Then no more were eaten till about three hours after, when the owl was pleased to take four more mice.

The gopher is a small animal that does damage to growing things. It digs up corn after it is planted, and it gnaws the roots of fruit trees so as to hurt them badly. Owls catch gophers and eat them. This is one reason why the farmer likes the owl so well. Barn owls sometimes roost with pigeons, but they are good friends. We know they do not eat the pigeons because owls swallow their food whole and have to throw up the bones afterwards, and it is known that the owls living with the pigeons throw up bones of rats and mice but not of pigeons.

Sometimes so many mice have come upon the farms in England that it looked as if everything would be eaten up by them. But a great many owls always came when the mice were so thick and helped the farmers save their crops. One owl was seen to make, in thirty min-

utes, seventeen trips to her young with food.

A gentleman living in the West when there was so much damage done by grasshoppers found that the owls were living on them and not eating much of any other kind of food. The only way he could tell what the owls had for supper was to shoot an owl once in awhile and see what was in its stomach. One barn owl had thirty-nine locusts, twenty-two other insects, and one mouse which it had just taken. Screech owls and burrowing owls usually had more than two dozen locusts, and some of them had other kinds of insects.

A rabbit, a weasel, a mink, or even a skunk is good eating for the owl. And there are times when one owl will make a meal of another owl of smaller size. A large red-tailed hawk was once put into a garret where there was a snowy owl. That night the hawk was killed and partly eaten by the owl. A tame great horned owl and a little screech owl were shut up in a hay loft together. The wings of the big owl were cut so he could not fly. After about a week they both became one owl, and that owl threw up the claws, beak, bones, and feathers which had once been useful to the little screech owl.

Owls sometimes catch partridges and quails. This is not so bad, for they pick out the weak birds that are not well, and so keep disease from spreading among the fine birds. A hunter once shot a bob white so that it was not killed but could not fly. He and his dog were chasing the bird in the grass along a fence hoping to catch it. An owl saw the wounded bird and thought it belonged to him because it was not well. He came out of the woods very swiftly and picked up the bob white right before the eyes of the hunter.

In woods where there are panthers one will often hear in the night fearful cries that make it seem as if some wild beast were about to jump down from some tree near by to kill the one who is out so late. Most of these cries which frighten people so are made by hoot owls. But it is not easy to tell whether the sound comes from a hoot owl or from the throat of a wild cat.

There is a saying among country people who wish to seem wise: "I wasn't brought up in the woods to be afraid of owls."

The hoot owl has so many wild notes in his voice that it is not at all strange that he scares people who have not been brought up in the woods. Before he sends out his proper hoot he sometimes seems to try to frighten everybody out of the forest with his awful shrieks. Sometimes several hoot owls get together in the night to hold a concert. One of them seems to tell a funny story and all the rest break out with shouts of *he-he-he-he-hi-hi-hi-hi-ha-ha-ha-ha*, and then they become as solemn as any other owls, and the stillness of the night is perfect until another owl has a droll story or song to set the rest a-shouting at.

The owl is brave. One that weighed less than six ounces once fought a nine-pound rooster. A teamster in Maine once went to sleep on top of his load while his horses ate their oats beside a forest road. When he pulled the blanket away from his face an owl pounced down upon it, perhaps thinking his white skin was a rabbit, and tore his cheeks fiercely. He was much frightened, having just awakened. But he caught the owl and killed it after a short struggle, and called himself lucky because his eyes were not put out by the bird.

If the owl is a sober and wise bird he forgets all about it when he woos his mate. Such awkward dancing and foolish boo-hoo-ing is never seen except when the owl is trying to choose a mate for life. But he makes up for his awkwardness when there are eggs to sit upon, for the owl is the best husband a bird ever had. When there is room in the old hollow where the nest is he will sit on the eggs with his wife and help her hatch the puffy little owl children.

Owls are the best of parents, too, for they will risk their own lives freely to protect their young. If their nests are robbed and the old birds can find where their young ones are caged they will come daily with food for them though they are in great danger in doing so.

They lay their eggs earlier than other birds, and often the falling snow covers the back of the sitting bird. The warmth of her body melts it so that water runs gently down through the nest and forms icicles that hang below and glisten in the sunshine to tell of the faithful conduct of the mother owl.

Small birds, as a rule, hate owls, and they delight in getting round these great awkward fellows whenever they can catch them by day and doing all they can to hurt their feelings. Bird-catchers sometimes catch small birds be-

cause they are so fond of teasing owls. An owl is caught and tied to a tree. The tree is covered with sticky stuff called bird lime. As soon as a little bird sees the owl in the tree he cries to his friends and they come in great crowds to tease the owl. But the small birds find their desire to torment ends in their own capture, for they cannot get away from the bird lime until the trapper comes along and gathers all the little birds that are hanging to the sticky limbs and twigs about the big bird they were trying to tease.

THE DUCK MOLE.

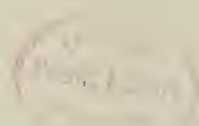
WE ARE indebted to Dr. George Bennett for the first good description of the duck mole (*Ornithorhynchus anatinus*) which was an object of wonder to naturalists long after its discovery. This enthusiastic investigator traveled to Australia for the sole purpose of observing the animal. Up to that time little was known of it. We simply knew that the duck mole lives in the water and was persistently hunted by the natives, as it yielded a savory flesh and laid eggs. The latter discovery was made by Caldwell in 1884.

The duck mole is about two feet in length, six inches of which are included in the tail. The males are larger than the females. The legs are very small, all four feet being five-toed and webbed. All the toes are very strong, blunt, and excellently adapted for digging. The middle toes are the longest. The tail is flat and is broad at the end, the extremity being formed by long hairs. It is abruptly cut off, and in old animals is either entirely naked beneath or covered with a few coarse hairs. In young animals it is quite hairy. The adult animal has only four horny teeth in its two jaws, of which the upper front tooth is broad and flat and resembles a grinder.

The fur of the duck mole consists of a coarse outer coat of a dark brown color with a silvery-white surface tinge,

and a very soft, grayish inner fur, similar to that of the seal and the otter. A peculiar fish-like odor is given forth by the fur, especially when it is wet. The Australians, however, are very fond of the flesh of the animal in spite of its disgusting odor. The duck mole is said to be fondest of calm spots in rivers filled with aquatic plants and the banks of which are shaded by the dense foliage of trees; and it constructs more or less complicated burrows in the banks. A tunnel about eighteen feet long terminates in a large chamber, both the chamber and its approaches being strewn with dry aquatic plants. The chamber usually has two entrances, one below the surface of the water, and the other about twelve inches above.

The duck moles are seen at all times in the rivers of Australia, especially during the spring and summer. They emerge from their retreats at dusk, though they sometimes also appear in the day time, searching for food. When the water is clear, the observer can follow with the eye the movements of the animal as it dives and reappears above the surface. It likes to stay near the shore, amidst the mud, searching for its food between the roots of the plants, where insects abound. The mollusks which it captures in its forays it stores temporarily in its cheek-pouches and then consumes them at greater leisure.





"On a beautiful summer evening," says Bennett, "I approached a small river in Australia, and as I knew the predilection of the duck mole for the hour of dusk, I tried to obtain a glimpse of one. With a constant grasp on our guns, we patiently stood on the shore. It was not long before we saw a black object appear near us on the top of the water, the head being raised but little above the surface. We stood motionless, lest we should scare the animal, carefully observing and following its movements, for one must be ready to shoot just as the duck mole reappears after diving. Only a shot in the head is effective, as the loose, thick fur will not allow a bullet to penetrate it readily. We wounded one which gave evidence of severe injury and sank immediately, but soon rose again. When the dog brought it to us we found it to be a fine male. Several minutes after it had been brought out of the water it apparently revived, and, instantly rising to its feet, staggered toward the river. About twenty-five minutes later it turned over several times and then died. As I had heard much about the danger of being pierced by its spur even when the animal is mortally injured, I put my hand near the so-called poisonous spur at the first grasp. In its violent exertions to escape the animal scratched me slightly with its hind paws and also with its spur, but despite the roughness with which I seized it, it did not wound me intentionally. I had also been further told that the duck mole lay on its back when it wished to use the spur, which statement will not be received as at all probable by anyone who knows the animal in ever so slight a way. I put it in this position, but it only strove to regain its feet without attempting to wound me by using its spur. In short, I tried in every way to induce the animal to make use of its spur as a weapon, but in vain; and I am perfectly convinced that the spur has another function than that of a weapon. The natives characterize the 'spur as 'mischievous,' that being with them a word which in general conveys the idea of dangerous or poisonous character; yet they use the same expression in speak-

ing of the scratches inflicted by the animal with the hinder feet, and they are not at all afraid of seizing a living duck mole. When the queer creature runs along the ground, it produces an impression of something unnatural, and its strange shape easily startles a timid person. Cats instantly take flight at its appearance, and even dogs, which are not specially trained, stare at it, prick their ears, and bark, but are afraid to touch it."

On another voyage Bennett discovered a burrow containing three young ones, upon which the hair had already grown, and which he could observe for some time. When he found the nest with the young ones and placed them on the ground, they ran to and fro, but did not make such savage attempts to escape as did the old ones. The natives, whose mouths watered at the sight of these fat young animals, said that they were about eight months old, and added that the young duck moles were fed milk by their mother only during their early infancy and later were given insects, small shells, and mud.

At evening Bennett's two little pets emerged from their cage at dusk and usually ate their food; then they began to play like a couple of young dogs, attacking each other with their beaks, lifting their fore paws and climbing over each other. They were very lively. Their little eyes gleamed and the apertures of the ears opened and closed in remarkably rapid succession. As their eyes stand quite high on their heads they cannot see very well straight ahead, and therefore are apt to come into collision with near-by objects. The young animals survived only five weeks.

The duck mole lays several soft-shelled eggs. The eggs are hatched in the nest. The newly-hatched young are small, naked, blind and as helpless as those of the pouched animals. Their beaks are short.

In the zoölogical garden at Melbourne duck moles have occasionally been kept of late years, but none have, thus far, reached Europe or America alive.

Brehm says that the duck mole is the last among the known mammals.

THE HIBERNATION OF ANIMALS.

NATURE presents no greater or more curious phenomenon than the habit of certain animals to conceal themselves and lie dormant, in a lethargic sleep, for weeks and months. It is known that in perfect hibernators the processes of nature are interrupted during the period of this long insensibility. Breathing is nearly, and in some animals, entirely suspended, and the temperature of the blood even in the warmer blooded animals, falls so low that how life can be maintained in them is a great mystery.

A variety of Rocky Mountain ground squirrels, when in perfect hibernation, says an observer, has a temperature only three degrees above freezing point of water, and when taken from their burrows are as rigid as if they were not only dead, but frozen. But a few minutes in a warm room will show that they are not only alive, but full of life.

As to the suspension of breathing in hibernators, the fact is proved sufficiently in the instances of the raccoon and the woodchuck. When they have laid themselves away for the winter sleep they roll themselves up comfortably and press their noses in such a position against their hinder parts that it would be an absolute impossibility for them to draw a breath. It is generally supposed that the bear rolls itself up in this way and does not breathe, but the holes melted in the snow beneath which the animal frequently stows itself, under a covering of leaves, prove that it does breathe while in its lethargy.

The marmot family produces the soundest winter sleepers. When the marmot is in its peculiar state of hibernation the electric spark will not rouse it. The most noxious gases do not affect it in the slightest. If its temperature is raised above that at which the animal breathed in its natural state it will die almost immediately.

Our own familiar wild animals, the bear, the raccoon, and the woodchuck—the so-called ground-hog—are classed as perfect hibernators, because they store no food for winter, but have acquired or provided themselves with

a thick, fatty secretion between the skin and flesh, which, it is supposed, supplies them with sustenance. As a matter of fact, although dormant animals absorb fat, it does not enter into their digestive organs. Food introduced into the stomach of a hibernating animal, or reptile, by force or artificial means, will be found undigested at all stages of its lethargy, for it invariably goes into its peculiar state on an empty stomach. That is one of the mysteries of the phenomenon, not so great, however, as the fact that bears and woodchucks produce their young during their winter sleep. The male bear is frequently roused from his sleep and is found by the woodsman roaming about in mid-winter, but they have never known, they say, a female bear to be killed after the season for hibernation has set in.

Squirrels are only partial hibernators, from the fact that they work all summer and fall storing great quantities of food to supply them when hunger wakes them up during the winter, some of them, no doubt, spending very little time in a lethargic sleep.

The common land tortoise, no matter where it may be, and it is a voracious feeder, goes to sleep in November and does not wake up again till May, and that curious animal, the hedgehog, goes to sleep as soon as the weather gets cold and remains in unbroken slumber six months.

Bats, at the beginning of cold weather, begin to huddle together in bunches in hollow trees, dark corners in deserted houses, and in caves and crevices in the rocks. They gradually lose all sensibility, and continue in a comatose state until the return of genuine warm weather. When you see the first bat of the season fluttering at nightfall you can be sure that warm weather has come to stay. The little hooks at the end of one of the joints of each wing are what the bat hangs itself up by when it goes to sleep, whether for a day or for months. When the bats are clustering for hibernation one of the number hangs itself up by its hooks, head downward, and the others

cling to it. It is on record that sixty bats have been found in one cluster, the entire weight of the lot being sustained by the one bat clinging with its hooks to whatever it had fastened them to at the start—a weight of at least ten pounds. The position of the central bat in such a cluster would be like that of a man hanging by his thumb-nails and supporting the weight of fifty-nine other men. So completely is animation suspended in the bat during the cold months that no test yet applied has induced it to show the least sign of life. Torpid bats have been inclosed by the hour in air-tight glass jars and not a particle of oxygen in the jars has been exhausted when they were taken out, showing that the bats had not breathed.

As cold drives certain animals, insects, and reptiles to a state of torpidity, so heat and lack of water bring about the same condition in others. The animal or reptile that hibernates, or goes to sleep in cold weather, arranges its body so that it will conduce to the greatest warmth, while those that estivate, or become torpid in warm weather, place themselves in positions that show that they want all the coolness the climate will permit. The tenrec, a tropical animal, carnivorous and insectivorous, becomes torpid during the greatest heat, and lies on its back with its body drawn to its greatest length, and its limbs spread wide apart. Snakes estivate in the South, all kinds together, just as snakes hibernate in the North, but instead of rolling themselves in great balls, as the northern snakes do, they lie singly, and stretched to their full length.

Want of water will cause the common garden snail to go into a state of the most complete and curious lethargy. This is the snail of the genus *Limax*, not the larger one of the genus *Helix*. In the latter the phenomenon of hiber-

nation is especially remarkable. In November the snail forms just a soft, silky membrane across the external opening of its shell. On the inner surface of that it deposits a coating of carbonate of lime, which immediately hardens the gypsum. This partition is again lined with a silky membrane. The snail then retires a little further into the shell and forms a second membranous partition, retiring again and again until there are six of these partitions between the snail and the lime-coated door at the entrance of the shell. In the recess behind all these partitions the snail lies torpid until May. All this time it lives without motion, without heat, without food, without air, without circulation or the exercise of any of its functions. If this snail is prevented from hibernating for several seasons by keeping it in a warm room, it will gradually waste away and die. A case is known where several snails of this genus were shut in a perforated box without food or water. They retired into their shells and closed them with a thin membrane. They remained so for three years, but revived when put into torpid water. They had been driven into torpidity by drought. The blood of this animal is white.

It may be of interest to state in connection with these animals who pass half the year, or less, in sleep, that there are several species of fish, reptiles, and insects which never sleep during their stay in this world. Among fish it is now positively known that pike, salmon, and gold-fish never sleep at all. Also that there are several others of the fish family that never sleep more than a few minutes during a month. There are dozens of species of flies which never indulge in slumber, and from three to five species of serpents which the naturalists have never been able to catch napping.

Apollo has peeped through the shutter,
And awakened the witty and fair;
The boarding-school belle's in a flutter,
The two-penny post's in despair.
The breath of the morning is flinging
A magic on blossom and spray,
And cockneys and sparrows are singing
In chorus on Valentine's day.

—*Praed.*

THE CAPE MAY WARBLER.

(*Dendroica tigrina*.)

LYNDS JONES.

THERE is hardly another group of birds that yields so satisfactory returns for earnest study as the American wood warblers. All shades and patterns of color are theirs, from somber to brilliant, from the plainest to the most intricate and exquisite pattern. Almost all degrees of vocal ability are found among them, from the simple twitter of the Tennessee to the wild thrilling challenge of the Louisiana water thrush or the ventriloquial antics of the yellow-breasted chat. Many bird students, it is true, regard the group as too difficult for any but the professional ornithologist to attempt; and that may be true of the females and of the autumnal plumages of the young, but the spring males are a constant inspiration and delight to one who admires variety in beauty.

It may be objected that the small size of the warblers renders their field study difficult, even if the foliage does not prove a serious hindrance. One must remember, however, that most small birds are not wary and that they may be closely approached, so that, with a good field-glass (and every bird-student should use one) their colors and the pattern of their dress can readily be made out even in the lower tree tops, where many of them feed. Foliage is always in the way, but even that can be circumvented by patience and perseverance.

The study of adult males in spring is greatly aided by the fact that each species, with some exceptions, has one or more patches of color peculiar to itself. Thus in the Cape May warbler the ear patches are rufous. Other species possess rufous colors, but none of them in this place.

The Cape May warbler belongs among the less common species, but may be common for a day or two during the height of the migration. It is very fond of or-

chards where it feeds among the foliage, snatching an insect here, a larva there, and cleaning the bundle of eggs from the leaf over yonder with an untiring energy. They also associate more or less with the other warblers in the woods. They are of great value to the fruit grower.

This species is found from the Atlantic coast west to the plains and north to Hudson's Bay, passing the winter in the tropics. It breeds from northern New England to Hudson's Bay and probably in northern Minnesota. The nest is built in a low bush in a wooded pasture or open woodland, said to be partially pensile. The nest and eggs are not readily distinguishable from those of several other warblers. The males sing frequently from their perch on the topmost twig of a spruce tree, thus misleading one as to the whereabouts of the female and nest. The song resembles somewhat that of the black and white warbler, but is rather less wiry. It cannot be represented on paper.

The tongue of this bird is worthy of special notice. It is cleft at the tip, and is provided with somewhat of a fringe. This character is not peculiar to this species, but is found in some honey creepers and in at least one foreign family of birds, thus suggesting, at least, the relationship of the warblers as a group. It might be asked, what is the significance of this character as regards feeding-habits? Apparently nothing, since the feeding-habits and food do not differ from those of other warblers not having the cleft tongue as greatly as the tongues themselves differ in structure. It is apparently an aberrant character developed somewhat at random among groups nearly related, or perhaps a remnant of structure.



SNOWFLAKES.

Falling all the night-time,
Falling all the day,
Silent into silence,
From the far-away;

Stilly host unnumbered,
All the night and day
Falling, falling, falling,
From the far-away,—

Never came like glory
To the fields and trees,
Never summer blossoms
Thick and white as these.

To the dear old places
Winging night and day,
Follow, follow, follow,
Fold them soft away;

Folding, folding, folding,
Fold the world away,
Souls of flowers drifting
Down the winter day.

—*John Vance Cheney.*

A TIMELY WARNING.

WHILE a British brig was gliding smoothly along before a good breeze in the South Pacific, a flock of small birds about the size, shape, and color of paroquets settled down in the rigging and passed an hour or more resting. The second mate was so anxious to find out the species to which the visiting strangers belonged that he tried to entrap a specimen, but the birds were too shy to be thus caught and too spry to be seized by the quick hands of the sailors. At the end of about an hour the birds took the brig's course, and disappeared, but towards nightfall they came back and passed the night in the main-top. The next morning the birds flew off again, and when they returned at noon the sailors scattered some food about the decks. By this time the birds had become so tame that they hopped about the decks, picking up the crumbs. That afternoon an astonishing thing hap-

pened. The flock came flying swiftly toward the brig. Every bird seemed to be piping as if pursued by some little invisible enemy on wings, and they at once huddled down behind the deck-house. The superstitious sailors at once called the captain of the brig, who rubbed his eyes and looked at the barometer. A glance showed that something was wrong with the elements and the brig was put in shape to out-ride a storm. The storm came down about twenty minutes after the birds had reached the vessel. For a few minutes the sky was like the waterless bottom of a lake—a vast arch of yellowish mud—and torrents of rain fell. Why it did not blow very hard, no one knows; but on reaching port, two days later, the captain learned that a great tornado had swept across that part of the sea. The birds left the vessel on the morning after the storm and were not seen again.

A WINDOW STUDY.

OLIVE THORNE MILLER.

ONE of the best places to study birds is from behind the blinds of a conveniently-placed window, where one can see without being seen.

My window one July looked into the tops of tall spruce trees, relieved here and there by a pine, a birch, or a maple. This was the home of the most fascinating and the most bewildering of feathered tribes, the warblers, and a rugged old spruce tree was a favorite "Inn of Rest" for every bird in the vicinity.

In all the years that I have known birds I have carefully avoided becoming interested in warblers, so tiny, so restless, so addicted to the upper branches, so every way tantalizing to study. But here, without intention on my part, fate had opened my windows into their native haunts, even into the very tree-tops where they dwell. "He strives in vain who strives with fate." After one protest I succumbed to their charms.

My principal visitor was a beauty, like most of his distinguished family, having a bright yellow head, set off by a broad black band beginning at the throat and running far down the sides, and he bore the awkward name "black-throated green warbler."

A bewitching and famous singer is this atom in black and gold. And not only is his song the sweetest and most winning, but the most unique, and—what is not generally known—the most varied.

The song that has been oftenest noticed, and is considered characteristic of the species, is sometimes syllabled as "trees, trees, beautiful trees," sometimes as "hear me Saint Theresa." But in my intimate acquaintance with some of the family that July I noted down from my window alone eight dis-

tinctly different melodies. My special little neighbor, who spent hours every day in the old spruce, sang the regulation carol of his tribe, but he also indulged in at least one other totally unlike that. Those two I have heard and seen him sing, one directly after the other, but he may have had half a dozen arrangements of his sweet notes.

Sometimes the mate of my spruce-tree neighbor appeared on the tree, going over the branches in a business-like way, and uttering a loud, sharp "chip."

One morning there suddenly broke out in the old spruce a great clatter of "tick-et! tick-et!" in the voice of a nestling. I snatched my glass and turned it at once upon a much-excited warbler, my black-throated green. He was hopping about in a way unusual even with him, and from every side came the thread-like cries, while the swaying of twigs pointed out a whole family of little folk, scrambling about in warbler fashion and calling like bigger bird babies for food. They were plainly just out of the nest, and then I studied my spruce-tree bird in a new role, the father of a family.

He was charming in that as in every other, and he was evidently a "good provider," for I often saw him after that day going about in great anxiety, looking here and there and everywhere, while a small green worm in the beak told plainly enough that he was seeking his wandering offspring.

During the remainder of the month I frequently saw, and more frequently heard, the little family as they followed their busy parents around on the neighboring trees.

One day I noted the singer flitting about the top of the spruce, singing most joyously, and almost as constantly as before the advent of the

nestlings, while the mother was hurrying over the lower branches of the same tree, collecting food for one youngster. Suddenly the song ceased, and the tiny papa joined the family party below, and addressed himself with his usual energy to the business of filling that greedy mouth.

Over and under and around and through the branches he rushed, every few seconds returning to stuff a morsel into the always hungry mouth, till he actually reduced that infant to silence, and then he slipped away, returned to his tree top, and resumed his lovely "tee-tee-tweetum!"

Somewhat later I heard the baby black-throats at their practice, droll, quavering attempts to imitate the musical song of their father. They soon mastered the notes, but the spirit was as yet far beyond them.

This happy life went on before my window till, almost at the end of July, a heavy fog swept in one evening from the ocean, and when, the next day, a cool north wind blew it back whence it came, it seemed to take the whole tribe of warblers with it. August was now upon the threshold, and in the bird world at least

"Summer like a bird had flown."

FIVE LITTLE WOODMEN.

E. F. MOSBY.

OUT of the woods they come, visiting our homes wherever they see a standing invitation in the shape of a tree. But each one has his preferences. One likes the evergreens best, another the bare trunk where it is easy to break the bark, and still another likes a fresh tree like the magnolia, glossy and full of life even in winter. You have guessed these are birds? Yes; and the small downy woodpecker comes first, and in all weathers. The other day after a sunrise of gold and a splendid rainbow arch, swiftly blotted out by a black storm with scudding rain and flying leaves, I caught sight of a tiny downy, in the very heart of all the uproar of the elements, busily pecking his way up a tree near my window. On another winter day, sunny and calm, he came flying overhead with a loud rattling note that spoke of good cheer in most neighborly fashion. It is a family, at the very least, that visits us. There are variations in size, if I mistake not, and one day a pair arrived together; the female with her glossy black velvet crown almost as handsome with her broad white satin stripe down the middle, and black and white markings, as her mate, who, indeed, only outshines

her by the lovely band of red on the head or nape of his neck, as you choose to call it. I fancy she is the more anxious housekeeper. At least, it was her persistent call-note, rather sharp in tone, that drew me from my lounge to watch her quick movements on the bark, and it is she that more quickly takes flight. He seems never disturbed by his inquisitive human neighbors, nor even the impudent sparrows—though he can send these to the right about if he pleases—and his tap, tap, tap, like a small drummer on the tree-trunk, is always pleasant to hear. I am glad to know they both have a cozy little home, a hole on the southern side of a tree, where the sun shines on good days, and fancy them tucked into round balls of feathers, only to be distinguished by the red on top, and comfortably asleep, when neither pleasure nor necessity invites them abroad.

The yellow-bellied sapsucker is also a winter guest, but he is far more timid than the downy, and I have often seen him routed by the sparrows or scared off by a sudden sound. The male is very gay in plumage, with much mottled yellowish brown on back, conspicuous white stripes on wings, beautiful clear yellow and black in front, scarlet on his

head and cardinal at his throat. The female has a white throat and cardinal or black cap. I have noticed one with a cardinal cap that had little black feathers sticking here and there like an emery bag. They are very full of fun, even riotous in play, and shout, in their summer home—the woods of the north—but they are very quiet when wintering with us, and often flit away without a sound.

Of the nuthatches, the pretty white-breasted one with his soft bluish-grey coat and shining black head, is our familiar resident and the red-breasted an occasional winter companion. They are charming little birds, not specially musical, though their call is vigorous and friendly, but very pretty and gentle, and awakening perpetual wonder and admiration at their feats as acrobats, running as lightly head downwards as in a natural position, and showing equal swiftness and grace in every movement, whether with aid of wings or without. They never seem in the least afraid of us, but raise their softly rounded heads and look at us with a most delightful confidence.

The brown creeper is like a bit of the trunk in his brown tints, mottled as if in mimicry of the play of light and shadow on the bark. He is as truly a tree-creature as ever Greek fable devised, and can so flatten himself, when alarmed, against a tree that no inch of his light breast is visible, and it is difficult, indeed, to recognize him as a separate being. He is the one species found in America of quite a large Old World family, and has some odd characteristics. First, his long tail, used to aid him in climbing, is rather curved and stiff and generally worn by constant use. His bill is also curved, so that the profile of his figure is like a relaxed bow as he works his plodding way up the side of the tree, diligently seeking insects, eggs, and larvæ, in the minute crevices of the bark. He sticks his little nest, made, of course, of bits of dead wood, bark, and twigs, between the tree and a strip of loose bark, very like a part of the tree itself, and the eggs are spotted and dotted with wood

colors, brown in different shades, and lavender. Altogether his life is a tree-study; the tree is to him home, model, hunting-ground, hiding-place, and refuge. He never descends by creeping, but when he wants to search a lower part of the trunk, he flies to the base, and begins it all over again. In the summer fir-wood, farther northward, it is said he sings, but in winter-time we hear only a faint squeak, a little like one bough scraping against another.

The black-and-white creeping warbler is very like our sober brown creeper in habit, but he, like most of his gay brethren, is only a summer guest. In his place we have Carolina chickadees and golden-crowned kinglets—and even, by good luck, an occasional ruby-crowned. All these tiny creatures have the most charming and airy ways of flitting from bough to bough, swinging lightly from the utmost end of a bough, daintily dropping to unexpected resting-places, and rarely pausing for a second's breathing-time anywhere. The Carolina chickadee is said to have a longer note and more varied *repertoire* than his northern cousin, yet whenever I have heard him in winter weather, there is the same silvery and joyous tinkle of showering *Chick-a-dee-dee-dees* from the pretty gray and black-capped flock that I have heard in Massachusetts. Perhaps the variations are more evident in his summer singing.

I have left the kinglet for the last, but it is hard to do justice to this lovely little bird that, if the food-supply be all right, will often elect to stay with us in winter rather than migrate to Mexico. His colors are exquisite, olive-green bordered by darker tints that throw the green above and the yellow-tinted white below into fine relief; a brilliant crown of reddish-gold, bordered by black and yellow, and every feather preened to satiny smoothness. He gleans his food merrily, singing or calling softly to himself as he works. His nest is built in the far northern forests, sometimes swinging as high as sixty feet, and woven of pale green mosses, lined with strips of the silky inside bark and down for the many nestlings.





Butter-nut.
Edible pine.
Cross section Black Walnut.

Cocoa-nut.

COPYRIGHT 1899,
NATURE STUDY PUB. CO., CHICAGO.

Butter-nut in husk.
Black Walnut.

THE COCOA-NUT.

THE fruit of the cocoa-nut palm, (*Cocos nucifera*), which is the most useful tree of all its tribe to the natives of the regions in which it grows, is one of the most valuable and important of commercial products. On the Malabar and Corvoman-del coasts of India the trees grow in vast numbers; and in Ceylon, which is peculiarly well situated for their cultivation, it is estimated that twenty millions of the trees flourish. The wealth of a native in Ceylon is estimated by his property in cocoa-nut trees, and Sir Emerson Tennent notes a law case in a district court in which the subject in dispute was a claim of the twenty-fifth twentieth part of an acre of palms. The tree is very beautiful and lofty, growing to a height of from sixty to one hundred feet, with a cylindrical stem which attains a thickness of two feet. It terminates in a crown of graceful leaves. The leaf sometimes attains a length of twenty feet, consists of a strong mid-rib, whence numerous long, acute leaflets spring, giving the whole, as one traveler described it, the appearance of a gigantic feather. The fruit consists of a thick external husk or rind of a fibrous structure, within which is the ordinary cocoa-nut of commerce. The nut has a very hard, woody shell, inclosing the kernel, within which again is a milky substance of a rather agreeable taste.

The cocoa-nut palm is so widely disseminated throughout tropical countries that it is impossible to distinguish its original habitat. It flourishes with equal vigor on the coast of the East Indies, throughout the tropical islands of the Pacific, and in the West Indies and tropical America. It is most at home, however, in the numerous small islands of the Pacific Ocean. Its wide dissemination is accounted for by the shape of the fruit, which, dropping into the sea from trees growing along the shores, would be carried by the tides

and currents to be cast up and to vegetate on distant coasts.

The uses to which the various parts of the cocoa-nut tree are applied in the regions of their growth are almost endless. The nuts supply a considerable proportion of the food of the people, and the liquor enclosed within them forms a pleasant and refreshing drink. The liquid may also be boiled down to sugar. When distilled it yields a spirit which is known as "arrack." The trunk yields a timber which is known in commerce as porcupine wood, and is used for building, furniture, and firewood; the leaves are plaited into fans and baskets, and for thatching roofs of houses; the shell of the nut is employed as a water vessel, and the outer husk or rind yields the fiber which is used for the manufacture of ropes, brushes, cordage and the like. Cocoa-nut-oil is an important article of commerce. It is obtained by pressing or boiling the kernels, which are first broken up into small pieces and dried in the sun. It is estimated that one thousand full-sized nuts will produce upwards of twenty-five gallons of oil. The oil is a white, solid substance at ordinary temperature, with a peculiar rather disagreeable odor. Under pressure it spreads into a liquid and a solid, the latter being extensively used in the manufacture of candles.

Within late years the oil has also been manufactured into cocoa-nut butter, retaining, however, in a greater or less degree a distinct flavor of the nut.

The monkeys and orang-outangs are very expert in destroying the tough outer covering of the cocoa-nut, though quite two inches thick. They insert their teeth into the tapering end of the nut, where the shell is very uneven, hold it firmly with the right foot, and with the left tear the covering to pieces. Then thrusting a finger into one of the natural apertures they pierce a hole, drink the milk, break the shell on some hard object and eat the kernel.

THE BLACK WALNUT AND BUTTERNUT.

THE black walnut (*Juglans nigra*) is found in the rich, deep soils, from western Massachusetts, west to southern Minnesota and southward to central Texas and northern Florida. It is not found along the gulf or Atlantic coasts to any extent, but abounds west of the Allegheny mountains, especially in the Mississippi Valley. The tree grows rapidly and to a great size, one specimen on Long Island having attained a circumference of twenty five feet.

The wood is dark-colored, becoming almost black when properly seasoned, and was formerly extensively used for cabinet work, inside finish, gun stocks, and many ornamental purposes; it is not in so much demand at present, as other cheaper woods may be had which seem to answer the purposes quite as well, but it is still numbered among our valuable forest productions.

The nut has a thick, hard shell, which is deeply and unevenly corrugated with rough, sharp points and ridges, and is almost too well known to admit of description. The kernel is large and sweet, but has usually a rather strong, rank taste, less oily than the butternut. An oil is expressed from its kernel which is known as nut-oil, and is much used by painters as a

drying oil. A kind of dye is also manufactured from the husk, or outside cover, of the nut.

The butternut, as its name *Juglans cinerea* implies, is somewhat related to the black walnut, in fact, rare instances are recorded in which the two species have become mixed, forming a tree which resembled both species. It is found in about the same regions frequented by the black walnut, but extends further east and north into New Brunswick, Maine, Quebec, and Ontario, and does not extend quite so far west. It is most abundant in the Ohio River Valley. It is not so plentiful in the forest as the black walnut, and where it is so found does not fruit well. Its favorite resort is an open grove or along a fence row. Attempts to cultivate it generally yield only disappointment, but under right conditions the trees are very fruitful, one tree having been known to produce forty bushels in a single season, and trees bearing twenty bushels are frequently reported.

The fruit is longer than that of the black walnut and tapers to a point at both ends, with the ridges somewhat more pronounced, but aside from the difference in shape they present a similar appearance.

THE EDIBLE PINE.

THE edible pine, or piñon (*Pinus edulis*), is only one of many varieties of pinenuts which grows on the Pacific Slope of the United States and in Colorado, New Mexico, Arizona and Mexico.

The pine nut has a rich, marrowy kernel in a shell that varies in thickness from that of a chestnut to that of a hazel-nut. The form and size of the nuts also vary greatly according to the species. They are but little known to the people of the eastern states, but in some of the cities of California they are marketed in large quantities. The larger ones are valued for dessert and confectionery purposes and will doubtless become popular in the East.

They are well known to the Indians and have formed a staple article of their diet for centuries. Their method of harvesting them is very simple. They collect the cones after they have fallen from the trees, then heat them until they open, then rattle them out upon their blankets.

Of the twenty-four species of pine which grow along the Pacific Slope one-half furnish seeds that are esteemed by the Indians as food. When a Mexican Indian starts out on a long trip across the country and does not wish to burden himself with food he fills a small pouch with piñon nuts and can subsist on a small number of them for a remarkably long time.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. V.

MARCH, 1899.

No. 3

THE TUFTED TITMOUSE.

(*Parus bicolor.*)

LYNDS JONES.

HOW vividly a first meeting with some interesting species rests in the memory of the bird-lover! It was at the evening twilight of October, 14, 1886, that a strange whistle rang through that gem of woods near Grinnell, Iowa, which has witnessed the birth of more than one passion for bird study. Soon the busy gleaner came to inquire after the intruder on his chosen feeding grounds, evidently looking for a suitable resting-place for the night while taking his evening lunch. The voice, the actions, the appearance, all were new to me, and every movement was watched with breathless interest lest the next flight should take the bird away beyond recall. At last he settled in a green-briar tangle, carefully stowed himself away beneath a huge linden leaf, whistled once or twice, and was ready for the coming darkness.

Never before nor since have I seen the tufted tit in that Iowa grove, but he is one of the common resident birds at Oberlin, Ohio. Northern Ohio is about the northern limit of his range, which extends into northern New Jersey and southern Iowa, possibly the southern half of Iowa. He ranges west to the eastern border of the plains, occasionally found as far north as Minnesota and well into Michigan, and is found breeding even to the Gulf of Mexico southward. He appears to be resident wherever found, but no

doubt a few venturesome individuals may wander farther north than the usual range.

One can hardly mistake the tufted tit for any other bird, for he is very noisy the most of the year, the exceptions being the coldest part of mid-winter and during the breeding season, for his songs or whistles are peculiar to him. True, his chick-a-dee-dee closely resembles the chickadee's song to the uninitiated, but the clearly whistled *pe-to*, *pe-to*, *pe-to*, or *ee-to*, *ee-to*, *ee-to*, or *pe-ter*, *pe-ter*, *pe-ter*, or *pe-ter*, *e-ter*, *e-ter* will at once discover him. It is well worth one's while to write out the many different variations that may be heard proceeding from one bird. Another favorite one, judging from the frequency of its use, is: *Pe-dl'*, *pe-dl'*, *pe-dl'*, or *te-dl'*, *e-dl'*, *e-dl'*, and occasionally this: *Chee-pa*, *chee-pa*, *chee-pa*. In short, he seems to have a song to suit every occasion.

Like the chickadee, he delights in scrambling about the trees in the most reckless fashion, hanging head down as handily as a nuthatch. His crest gives him a more stately air than any of his cousins, but his inquisitiveness is equal to all combined. One cannot enter the woods but he will be sought out by this active denizen and accompanied hither and thither with not so much as a "by your leave."

His habits seem to vary with locality, or possibly more exactly, with

abundance. In this part of northern Ohio, where the species is not more than fairly common, the birds rarely enter the villages, and they nest almost exclusively in the woods. I am informed that farther south and west they are often seen in villages, and nest there in boxes provided, as well as in the woods.

The nest is placed within a box or hollow in a tree, a deserted woodpecker's hole being preferred, where leaves, strips of bark, feathers, hair, or almost any soft, warm materials are arranged carefully, the coarser material outward, the finer and warmer inside. The eggs range from five to eight in number, and are creamy white, rather

coarsely and evenly marked with shades of rufous brown. They average about .73x.54 of an inch. It is said that the male bird never assists in building the nest, but sings to cheer his mate, thus revealing the whereabouts of the nest.

While the northern Ohio woods are incomplete without a company of these cheerful birds, I have looked in vain for them during the early summer months in some years. In winter they range the woods for food, penetrating to every portion of it, stowing themselves away in some warm hollow in a tree at night, but in the nesting season they are confined to the region of the nest, and so are not readily seen.

EPITAPH ON THE HARE.

Here lies, whom hound did ne'er pursue,
Nor swifter greyhound follow,
Whose foot ne'er tainted morning dew,
Nor ear heard huntsman's halloo.

Old Tiney, surliest of his kind,
Who, nursed with tender care,
And to domestic bounds confined,
Was still a wild Jack hare.

Though duly from my hand he took
His pittance every night,
He did it with a jealous look,
And, when he could, would bite.

His diet was of wheaten bread,
And milk, and oats, and straw;
Thistles, or lettuces instead,
With sand to scour his maw.

On twigs of hawthorn he regaled,
On pippin's russet peel,
And, when his juicy salads failed,
Sliced carrot pleased him well.

A Turkey carpet was his lawn,
Whereon he loved to bound,

To skip and gambol like a fawn,
And swing his rump around.

His frisking was at evening hours,
For then he lost his fear,
But most before approaching showers
Or when a storm was near.

Eight years and five round rolling moons
He thus saw steal away,
Dozing out all his idle noons,
And every night at play.

I kept him for his humor's sake,
For he would oft beguile
My heart of thoughts that made it ache,
And force me to a smile.

But now beneath his walnut shade
He finds his long last home,
And waits, in snug concealment laid,
Till gentler Puss shall come.

He, still more aged, feels the shocks
From which no care can save,
And, partner once of Tiney's box,
Must soon partake his grave.

—Cowper.



A TRANSIENT BOARDER.

C. S. COOK.

WHEN I came down stairs in the morning I found him in possession of the premises. I watched him for a few minutes with much interest. I had not before seen a California wren, and found him very different in appearance and conduct from the eastern wrens with which I was acquainted. "Wrensie" was very self-possessed, and did not appear to resent my intrusion at all. In fact, he seemed disposed to ignore my presence, a fact which led me to judge it best to adopt the same course toward him.

I must explain our situation a little by saying that, as the cottage in which I was living was in a very unfinished condition, the lower floor was not divided by any partitions, the kitchen in the L and the front room forming one large room.

The weather being warm, and the walls open, the flies were very numerous in the room, a fact evidently keenly appreciated by the little fellow, for, as I proceeded to sweep the whole house he did not allow his industry to be seriously interfered with. While I was busy in the attic he was not idle down stairs; while I was regulating the front room he was picking up things in the kitchen. When I approached him too closely he would quietly slip out of doors through one of the numerous openings about the floor, or perhaps go up into the attic which was very accessible to him. He rarely remained out of doors more than a few minutes at a time. A forenoon of house-cleaning would seem more favorable to an estrangement than to a rapprochement; yet while I was at dinner I felt something upon my foot. Looking under the table I saw Wrensie perched upon my shoe. While I watched him he jumped up on a fold of my trousers, apparently thinking it a better point of observation. He was not disturbed by my interest nor by my motions at the table. He never seemed to mind ordinary motions even when he was very near. With other birds I have

considered entire quiet necessary under such circumstances.

I maintained my policy of manifesting no concern as to Wrensie's movements, merely abstaining from making any very sudden or rapid motions which would be likely to startle him. With this single exception I went about all work freely. While I would have been glad to cultivate his acquaintance, quickly, I thought it better not to try to do so. The universal method of winning favor in the eyes of such strangers is to feed them; but Wrensie would have nothing but live game, and no kitchen delicacy received a moment's attention. Fortunately, however, there was little need of studying to win his confidence, as but little encouragement was necessary. He was afraid of nothing; not from innocent ignorance by any means, but from complete self-confidence. He was not defiant, but intrepid. This confidence was not gained by observing that he was not molested, but had its source in the spirit of the bird, as shown by the fact that there was little difference in his demeanor during the six days he was with me.

The next day a mason came to the ranch to see about a proposed fireplace and chimney. As we stood talking over the matter, one on each side of a small table, my little boarder came and made a thorough search for game among the various articles on the table. While working in the kitchen I often found him at my feet, several times even between them as I stood at the stove or table. This was a position of such danger to him that I felt obliged to be very cautious in my movements. Occasionally he would perch on my shoulder or head, never staying very long but never betraying any distrust.

It was most entertaining to watch him in his pursuit of game. As a hunter he was full of resources, untiring in his efforts, insatiable in his appetite. When he saw a fly on the floor or table near him he would slowly and stealthily approach, his little black eyes snapping,

his frontal feathers depressed so as to give him a vicious look, and often with his wings trembling with excitement as he held them slightly loosened at his sides. When he judged himself near enough he would make a little run and try to snap up his victim. This method of stalking, though much used, was the least successful of his hunting expedients, a large majority of the flies escaping.

When in a favorable locality he would sometimes keep quiet for a time—that is, relatively quiet—as quiet as a small bird can be expected to remain, ready to seize any impudent flies that came within the reach of his bill, which would snap on them with a loud sound. He was most skillful at this, making the quickest motions conceivable. Although these snap shots were very successful, the flies rarely came past in sufficient numbers to satisfy him long, and he would soon set out to hunt up his game.

Then there was the full chase. It was not now a matter of a little dash on foot, but a full flight after a big blue-bottle fly which can dart through the air like a bullet. Back and forth they go with a great rush and much dodging. When caught, these big flies made a large mouthful for the victor. He would light on the floor and proceed to swallow his prey. This usually required several efforts. Watching him called to mind one's own experiences with big gelatine capsules. With the final and successful effort Wrensie's eyes would close with a distressed look as the fly went down his throat.

Flies were often to be found floating on the surface of the water in a large water pail. This fact did not long escape Wrensie's eye, and he made his round to this trap with much regularity. When the pail was well filled with water he could reach the flies with comparative ease; but when the water became low this became a most difficult matter. He did not fly down to get them, but would reach down while hanging to the edge of the pail. Often repeated trials were necessary. It was surprising to see to what a distance he could stretch himself in these efforts. Holding on to the edge always, he would

swing himself down, stretch his neck to the utmost, and then, just as he was on the point of falling into the water, with a quick flutter of his wings he would raise himself to the top again, never relinquishing his hold on the rim. In this way he would pick up flies at the center of the pail when it was not half filled with water, which, in view of the small size of the bird, was an acrobatic feat.

Then there was the battue. When he approached a window thickly covered with flies a scene of the wildest excitement followed. Wrensie would dash into the melee, afoot or a-wing as it happened, his bill snapping faster than a repeating rifle. The slaughter would be continued until the remaining flies were dispersed, which soon came to pass.

Even the still hunt was not without interest. No setter ever worked the ground more faithfully. Every nook and corner of the house was examined for moths. Moreover, every article was scrutinized, and, when possible, he looked beneath and within. A pair of working gloves lay upon the floor. Wrensie unhesitatingly went in, disappearing entirely and remaining long enough to put his head into every finger—which he may, or may not have done. It interested me much to note that in such explorations his assurance was complete. In this kind of delving I was prepared to see some hesitation in my presence. It seemed to me that when I was standing by him it would be only reasonable caution on his part to remain where he could keep his eyes on me. But he never seemed to watch me; and gave me numerous opportunities to capture him, as he would disappear in a dish or in some hole, and remain for some time. He never hesitated in this, nor did he seem to scrutinize his surroundings before going out of sight.

Wrensie was not only persistent and thorough in his search for moths in dark corners, but determined as well. He would crowd himself into openings so narrow that he would have to back out after concluding the search. One day he undertook to pass between two cans on a shelf. He made a strong effort,

but so narrow was the passage that he could not push his way in; his wings were too prominent. He backed away a few steps and looked at the crack a moment with his head cocked on one side. Then quickly stepping up to it, he stood on one leg, turned his body up edgewise, and squeezed through.

Perhaps as good an example as I can give of Wrensie's fearlessness is to describe his behavior one day when I had some work to do on the outside of a window. I stood on a staging just in front of the window, and was engaged in driving nails in the window casing. This hammering made a great noise, shaking the loose sash sharply. Wrensie was busily engaged catching flies on the inside of the window, standing on the top of the lower sash; that is, at the middle of the window. All my motions, all the noise and the jar failed to frighten him away, although at times he looked at me pretty sharply.

While so courageous in most ways, still Wrensie had his ideas of caution. Upon my return to the house after a short absence he would usually leave the room abruptly, either going out of doors or up into the attic. Even if I came in very quietly, taking precau-

tions not to disturb him, the result was the same. This conduct always seemed to me a curious fact, and an inconsistency which I could not explain.

Clever and interesting as he was, Wrensie had his shortcomings. His disposition was not that of the typical bird: "Sweetness and light" were not his. In his spirit was none of the exuberent joy of the great songsters, nor any of the bonhomie of happy-go-lucky sparrows. During the whole term of our acquaintance not a sound left his throat! In complete silence did he pursue his vocation. A perfect helpmate, but a faulty companion. A very practical sort of bird he was, full of activity, but without vivacity. Can it be that the spirit of our industrial age is so pervasive that even the birds are unable to escape its influence? It would seem that evolution has produced the utilitarian and "strictly business" type of character among them.

One day there was a noisy flutter of wings at the door, and the harsh cry of the butcher-bird was heard. On stepping out I saw feathers floating in the air. I concluded that I would see no more of my little companion and helper. The blue-bottle fly was avenged.

THE SQUIRREL'S USE OF HIS TAIL.

BY JAMES NEWTON BASKETT, MEXICO, MO.

OF COURSE every one who has had a pet squirrel has noticed what an important thing his tail seems to be to him. When he makes his toilet he usually ends by bringing the hairy brush around and apparently wiping his face with it, as though it were his towel. But I suspect that he is as much concerned, even here, about the care of his tail as about the cleanliness of his features, for Bunny's beauty, like that of some others, lies as much in his train as in his countenance. One use, therefore, of the squirrel's tail is to make him look pretty. I think, at least, no one can see him put it into such graceful curves along with his delightful postures without feeling that he is posing for esthetic effect.

Still, a little study of his ways may

make us think that there is a more practical purpose even in this feature of his tail's use. We had a pet squirrel in the house recently—one of the western fox species or variety. He had become quite tame in his cage before he was released in my study. At intervals I had him brought in, and we usually romped together at least once a day.

At first everything was so new and strange to him that he was very shy and must go about investigating. I noticed that, as he approached anything which he feared might prove dangerous, he always projected his tail over his back far forward—sometimes feeling the object with the extreme hairs before touching it with his nose. He annoyed me greatly by tearing the wall paper from a certain angle. One

day I threw a pamphlet so as to strike just above his nose while at his mischievous. It frightened him badly, and he suspected that the scare had come out of the wall. But he could not resist the fascination of this sport, and it was interesting to watch him approach and try by all sorts of devices of his tail to see if the enemy were within.

If he were walking past or around anything that he feared he kept his tail stretched at full length on the side of his body that was next the object—sometimes he held it many inches from himself. If something moved suddenly in front of him as he ran, his tail shot over him away ahead of his nose, as if projected there by his sudden stop. But it was the natural instinct of thrusting his tail at anything threatening him too suddenly for flight. Much of his play at times was a kind of mock fright in which he seemed to imagine himself pursued by all kinds of enemies—even myself—and the most familiar objects becoming terrible. Then the use he made of his tail was most exaggerated, having in it perhaps some of the elements of terrifying the enemy, as seen in the swelled tails of cats, the bristles of hogs, dogs, etc.

One could not resist the impression that the tail was thrown out as a shield or a screen, but this did not always seem a satisfactory explanation, for it was certainly a very frail thing and very conspicuous. Besides, it would seem to furnish the enemy a good handle to catch hold of.

The theory has been advanced that this last is the very purpose of this use of the tail; and from my study of this pet I became convinced that he thrust out his tail when suddenly surprised in the hope that it might be taken and his body left. The skin on the tail of most rodents (of which the squirrel is one) slips easily from the bone, and leaves, to a grasping enemy, often a little bunch of "hide and hair." So Bunny offers this—feeling that he would rather leave his tail in jeopardy and go into life whole otherwise. The glass-snake (a lizard) in its efforts to escape, frequently *breaks off* a portion of its tail, which the pursuing enemy may

stop to capture while the body wriggles into safety.

This, likewise, is doubtless one of the reasons why the squirrel insists upon the tail's being always curled up over his back while he is absorbed in eating. It is not always merely a beautiful pose. As he thus sits in the trees his greatest enemies are the various large birds of prey which may dart down on him from above. Now, this mass of tail that is above him is apt to mislead the aim of the enemy, and, like the pioneer's cap thrust around the tree, is intended to draw the fire into a harmless medium.

There can be no doubt that a squirrel uses his tail to steer him in a leap, much as the tail steers the boy's common kite. Perhaps, also, it acts slightly as a balance, but in this respect its greatest use must lie in its "up and down" rudder effect—or rather parachute-like effect—as he makes those tremendous leaps from a tall treetop to the earth.

Here it comes well into play in lessening the shock of alighting, an emergency enabling him to escape some enemies—as a weasel or mink, perhaps—which may chase him around in the trees.

The arrangement of the long hairs, projecting out sideways on the bone, is strikingly like that of the feathers on the tail of the very earliest reptile-like birds which had long bony tails, used doubtless as the squirrel's, since they were down-sailers rather than up-flutterers—if I may be allowed to so compound my words and ideas. Some other downward-leaping mammals have the hairs similarly arranged. Another rodent, the anomalure, which flies down, as a flying-squirrel, by thin membranes, has special horny scales on the under side of its tail either to assist in climbing or to resist slipping down when a tree trunk is grasped.

The squirrel's tail, therefore, is a factor of his safety, as well as a feature of his ornamentation.

Another use which he makes of it is that when he "lies down to pleasant dreams" it forms "the drapery of his couch"—a coverlid for his head and body.

THE NORTHERN PRAIRIE HARE.

THIS is the most northern species of the group of hares (*Lepus campestris*), familiarly known in the United States as jack rabbits because of their large size and enormous ears. They are lively animals of astounding jumping powers. In America there is no such distinction between the term "hare" and "rabbit" as there is in Europe, where the large, long-eared, stout varieties, living in shallow "forms," are named hares, and the smaller and more slender kind, which digs a deep burrow, is the "rabbit." In this country the authorities say that no well-defined distinction exists. Of the so-called jack rabbits the northern prairie hare here depicted may be taken as the type. It is one of the largest species of hares, measuring about twenty inches in length, and it has long, strong, and vigorous limbs, and such remarkably long ears that the popular name it bears is fully justified.

This northern species is found on the western prairies from British America to Colorado. It undergoes a winter change of coat, becoming nearly white, but the blanching is never complete and russet streaks or patches remain through the winter. The habits of this animal are those of hares in general, and all the species known as jack rabbits are famous for their great speed and for the astounding leaps they make in running. They are the most fleet and agile of American mammals. They are not much pursued for the reason that they are difficult to shoot, and their celerity of movement enables them to elude four-footed foes also. Pending the complete change from the summer brown to the snowy-white coat of winter, the animal presents a very singular mottled appearance.

Hares are a very important article of commerce and, during the winter season, tons of them are daily shipped to

the principal markets from all quarters. They are sold at cheap rates, and are frequently peddled about the streets by the cartload at surprisingly low figures.

The methods of pursuit and capture of these animals are numerous, but the most common and successful are trailing in the snow with dogs, hounding, and coursing. To trail hares in the winter one must have dogs of keen scent and a light fall of from two to four inches of snow must have been deposited the night previous to an early morning start. Two or more hunters equipped with dogs and guns usually start together. Thickets of elder and blackberry are sought where the game is known to lie. The hunters skirt the border of a patch of these bushes and the dogs are sent in. The dogs soon drive the hares from cover when they become a ready mark for the gunners. Where the ground is rocky they will try to hide by running into any hole or crevice which may offer protection. In hounding hares the hunters are stationed at various points on the paths as the hares, like deer and foxes, follow regular beaten tracks. The hounds start the game from belts of pine, cedar, or hemlock. Each hunter waits for the animals to pass his station and fires at them as they go by at full run. It is considered no mean accomplishment to secure a hare under these circumstances. Trapping and snaring are also methods of capturing jack rabbits. They are principally employed by pot hunters, and many people make it their sole business during the winter months. Greyhounds are used in coursing hares, but the jack rabbit frequently discomfits both horse and hound. Hares do not live in burrows, as is the case with the rabbit, but lie in a form in bush or thicket, a slight depression in the ground serving for a nest, or sometimes a hollow stump, or the under side of a

ledge of rock is selected. The young, when born, are covered with hair, their eyes are open, and they are able almost immediately to support themselves. The rabbit, on the other hand, is born with closed eyes, and requires the constant attention of the mother for some time. The hares are not so prolific as the rabbits, the female bringing forth but from three to five young at a litter, the rabbits bearing from five to eight.

Hares generally feed at night, lying in their forms in some bush or copse during the greater part of the day; rabbits, on the contrary, generally remain in the warmest corner of the burrow during the dark hours. The food of the hare consists of all kinds of vegetables similar in nature to cabbage and turnips, which are favorite dainties with it; it is also especially fond of lettuce and parsley.

The great speed of the hare in running is chiefly due to the fact that the hind legs are longer than the fore. This is also the reason why it can run better up hill than down. Generally it utters a sound only when it sees itself in danger. This cry resembles that of a little child, being a shrill scream or squeak.

Among the perceptive senses of the hare, hearing is best developed; the smell is fairly keen, but sight is rather deficient. Prudence and vigilance are its most prominent characteristics. The slightest noise—the wind rustling in the leaves, a falling leaf—suffices to excite its attention and awaken it from sleep. Dietrich Aus Dem Winckell says that the greatest vice of the hare is its malice, not because it expresses it in biting and scratching, but because it often proves its disposition in the most revolting manner, the female by denying her maternal love, and the male by his cruelty to the little leverets.

It is said that captive hares are easily tamed, become readily used to all kinds of nourishment usually fed to rabbits, but are very delicate and apt to die. If they are fed only on hay, bread, oats, and water, and never anything green, they live longer. A tame hare, in the possession of Mr. Fuchs in Wilden-

berg, which slept and ate with his dogs, ate vegetable food only in default of meat—veal, pork, liver, and sausage causing it to go into such raptures that it would execute a regular dance to get at these dainties.

Besides the flesh, which as food is justly esteemed, the fur of the hare is also put to account. The skin is deprived of its hair, tanned and used in the manufacture of shoes, of one kind of parchment, and of glue; the hair is used in the manufacture of felt.

Mark Twain, in his "Roughing It," gives this humorous and characteristic description of the jack rabbit:

"As the sun was going down, we saw the first specimen of an animal known familiarly over two thousand miles of mountain and desert—from Kansas clear to the Pacific ocean—as the 'jack-ass-rabbit.' He is well named. He is just like any other rabbit, except that he is from one-third to twice as large, has longer legs in proportion to his size, and has the most preposterous ears that ever were mounted on any creature but a jackass. When he is sitting quiet, thinking about his sins, or is absent-minded, or unapprehensive of danger, his majestic ears project above him conspicuously; but the breaking of a twig will scare him nearly to death, and then he tilts his ears back gently, and starts for home. All you can see then, for the next minute, is his long form stretched out straight, and 'streaking it' through the low sage-bushes, head erect, eyes right, and ears just canted to the rear, but showing you just where the animal is, just the same as if he carried a jib. When he is frightened clear through, he lays his long ears down on his back, straightens himself out like a yardstick every spring he makes, and scatters miles behind him with an easy indifference that is enchanting. Our party made this specimen 'hump himself.' I commenced spitting at him with my weapon, and all at the same instant let go with a rattling crash. He frantically dropped his ears, set up his tail, and left for San Francisco at lightning speed. Long after he was out of sight we could hear him whiz." C. C. M.

DESTRUCTION OF BIRD LIFE.

STEPS have been taken under the direction of the New York ölogical society to ascertain, as nearly as possible, to what extent the destruction of bird life has been carried in this country and the result of the investigation is given in its second annual report, recently published. Replies to questions on the subject were received from over two hundred competent observers in the different states and territories, and the following table is believed to give a fair, certainly not exaggerated, idea of the loss of bird life within the past decade and a half.

The following are the percentages of decrease throughout the states mentioned, during the last fifteen years, according to the reports:

Maine.....	52 per cent.
New Hampshire.....	32 per cent.
Vermont.....	30 per cent.
Massachusetts.....	27 per cent.
Rhode Island.....	60 per cent.
Connecticut.....	75 per cent.
New York.....	48 per cent.
New Jersey.....	37 per cent.
Pennsylvania.....	51 per cent.
Ohio.....	38 per cent.
Indiana.....	60 per cent.
Illinois.....	38 per cent.
Michigan.....	28 per cent.

Wisconsin.....	40 per cent.
Iowa.....	37 per cent.
Missouri.....	36 per cent.
Nebraska.....	10 per cent.
North Dakota.....	58 per cent.
District of Columbia.....	33 per cent.
South Carolina.....	32 per cent.
Georgia.....	65 per cent.
Florida.....	77 per cent.
Mississippi.....	37 per cent.
Louisiana.....	55 per cent.
Texas.....	67 per cent.
Arkansas.....	50 per cent.
Montana.....	75 per cent.
Idaho.....	40 per cent.
Colorado.....	28 per cent.
Indian Territory.....	75 per cent.
General Average.....	46 per cent.

At least three-fifths of the total area of the United States is represented by the thirty states and territories above named, and the general average of decrease of bird life therein is 46 per cent. These figures are startling indeed and should arouse everyone to the gravity of the situation which confronts us. It requires but little calculation to show that if the volume of bird life has suffered a loss of 46 per cent. within fifteen years, at this rate of destruction practically all birds will be exterminated in less than a score of years from now.

WE BELIEVE IT.

THERE is no being so homely, none so venomous, none so encased in slime or armed with sword-like spines, none so sluggish or so abrupt in behavior, that it cannot win our favor and admiration—the more, the better we know it. However it may be in human society, with the naturalist it is not familiarity which breeds contempt. On the contrary, it has been said, with every step of his advancing knowledge he finds in what

was at first indifferent, unattractive, or repulsive, some wonder of mechanism, some exquisite beauty of detail, some strangeness of habit. Shame he feels at having so long had eyes which seeing saw not; regret he feels that the limits of his life should be continually contracting, while the boundaries of his science are always expanding; but so long as he can study and examine, he is so far contented and happy.

THE PINEAPPLE.

THIS tropical fruit is so-called from its resemblance in form and appearance to the cones of some species of pine. Its botanical name in most general use is *Ananassa sativa*, but some botanists who do not regard it as distinct from *Bromelia*, call it *B. ananas*. The *Bromeliaceae*, to which it belongs, are a small family of endogenous plants, quite closely related to the canna, ginger, and banana families, and differing from them in having nearly regular flowers and six stamens, all perfect. As the pineapple has become naturalized in parts of Asia and Africa, its American origin has been disputed, but there is little doubt that it is a native of Brazil, and perhaps some of the Antilles, now a part of the domain of the United States. This fruit is a biennial, with the habit of the Aloe, but with much thinner leaves. In cultivation it early produces seeds but, in ripening, the whole flower cluster undergoes a remarkable change; all parts become enormously enlarged, and when quite ripe, fleshy and very succulent, being pervaded by a saccharine and highly flavored juice. Instead of being a fruit in the strict botanical sense of the term, it is an aggregation of accessory parts, of which the fruit proper forms but a very small portion.

The first pineapples known in England were sent as a present to Oliver Cromwell; the first cultivated in that country were raised in about 1715, though they were grown in Holland in the preceding century. The successful cultivation of the fruit was early considered one of the highest achievements in horticulture, and the works of a few years ago are tediously elaborate in their instructions; but the matter has been so much simplified that anyone who can command the proper temperature and moisture may expect success.

For many years pineapples have been taken from the West Indies to

England in considerable quantities, but the fruit is so inferior to that raised under glass that its cultivation for market is prosecuted with success. The largest fruit on record, as the produce of the English pineries, weighed fourteen pounds and twelve ounces. Better West Indian pineapples are sold in our markets than in those of England, as we are nearer the places of growth.

The business of canning this fruit is largely pursued at Nassau, New Providence, whence many are also exported whole. The business has grown greatly within a few years, and now that the United States is in possession of the West Indian islands, exportations may be expected to increase and the demand satisfied.

More than fifty varieties of the pineapple are enumerated. The plant is evidently very variable, and when South America was first visited by Europeans, they found the natives cultivating three distinct species. Some varieties, with proper management, will be in fruit in about eighteen months from the time the suckers are rooted. The juice of the pineapple is largely used in flavoring ices and syrups for soda-water; the expressed juice is put into bottles heated through by means of a water bath and securely corked while hot. If stored in a cool place it will preserve its flavor perfectly for a year. The unripe fruit is very acrid, and its juice in tropical countries is used as a vermifuge. The leaves contain an abundance of strong and very fine fibers, which are sometimes woven into fabrics of great delicacy and lightness.

Nor is it every apple I desire;

Nor that which pleases every palate best;
'Tis not the lasting pine that I require,

Nor yet the red-cheeked greening I request,

Nor that which first beshrewed the name of wife,

Nor that whose beauty caused the golden strife.

No, no! bring me an apple from the tree of life.

C. C. M.



LITTLE BUSYBODIES.

BELLE P. DOWNEY.

ONE'S own observation tends to confirm the wonderful stories told by naturalists about ants. They have a claim to rank next to man in intelligence.

Seven or eight ants once attempted to carry a wasp across the floor. In the course of the journey they came to a crevice in a plank caused by a splinter which had been torn off. After repeated attempts to cross this deep ravine all the ants abandoned the task as hopeless except one who seemed to be the leader of the enterprise. He went on a tour of investigation, and soon found that the crevice did not extend very far in length. He then went after the retreated ants. They obeyed the summons and returned, when all set about helping to draw the wasp around the crevice. This little incident proves the ant is possessed of the power of communicating its wishes to others. Ants have been seen to bite off the legs of a cockroach in order to get it into the narrow door of their nest. The brain of ants is larger in proportion to their size than that of any other insect. Naturalists think that they have memory, judgment, experience, and feel hatred and affection for their kind. They are valorous, pugnacious, and rapacious, but also inclined to be helpful as they assist each other at their toilet. They have a peculiarity among insects of burying their dead. It is a curious fact that the red ants, which are the masters, never deposit their dead by the side of their black slaves, thus seeming to show some idea of caste.

Ants yawn, sleep, play, work, practice gymnastics, and are fond of pets, such as small beetles, crickets, and cocci, which they entertain as guests in their homes.

Indeed, ants are social, civilized, intelligent citizens of successfully gov-

erned cities. Even babies are claimed by the state. Their government is a happy democracy where the queen is "mother" but not ruler, and where the females have all the power. The queen is highly honored and at death is buried with magnificence. In her devotion to her lot in life she pulls off her glittering wings and becomes a willing prisoner in the best room of a house of many apartments. Here she is cared for by devoted followers who polish her eggs, carry them upward to the warmth of the sun in daytime, and back to the depths of the habitation to protect them from the chill of night. These eggs are so small as scarcely to be seen by the eye alone. They are bright and smooth, without any division. It is very strange, but these eggs will not develop into larvæ unless carefully nursed. This is effected by licking the surface of the eggs. Under the influence of this process they mature and produce larvæ. The larvæ are fed, like young birds, from the mouths of the nurses. When grown they spin cocoons and at the proper time the nurses help them out by biting the cases. The next thing the nurses do is to help them take off their little membranous shirts. This is done very gently. The youngsters are then washed, brushed, and fed, after which the teachers educate them as to their proper duties.

It is astonishing how many occupations are followed by these little busybodies whose size and weakness are made up for by their swiftness, their fineness of touch, the number of their eyes and a powerful acid which they use in self-defense. Their jaws are so much like teeth that they serve for cutting, while their antennæ are useful for measurement, and their front feet serve as trowels with which to mix and

spread mortar. Ants may be said to have the following occupations: Housewives, nurses, teachers, spinners, menials, marauders, soldiers, undertakers, hunters, gardeners, agriculturalists, architects, sculptors, roadmakers, mineralogists, and gold miners.

Ants keep cows—the aphides—for which they sometimes build stables and place in separate stalls from the cocci, which they also use. They make granaries where they store ant rice. If the grain begins to sprout they are wise enough to cut off the sprout. If it gets wet they have often been seen carrying it up to the sunshine to dry and thus prevent sprouting. The honey-ant is herself a storehouse of food in case of famine. This kind of ant has a distension of the abdomen in which honey is stored by the workers for cases of need. They inject the honey into the mouth of the ant. When it is needed she forces it up to her lips by means of the muscles of the abdomen. It is said that the Mexicans like to culture honey ants and eat the honey themselves.

The leaf-cutting ant is the gardener. It is devoted to growing mushrooms or at least a kind of fungi of which it is fond. This accounts for the beds of leaves it carries to its nest, on which the fungi develop.

The Roman naturalist, Pliny, gives an account of some ants in India which extract gold from mines during the winter. In the summer, when they retire to their holes to escape the heat, the people steal their gold. McCook has found that we have ants who are mineralogists, as they cover their hill with small stones, bits of fossils and minerals, for which they go down like miners more than a yard deep into the earth.

That some kinds of ants are architects has been clearly proven, for an observer saw an ant architect order his workmen to alter a defective arch, which they did, apparently to suit his views of how arches should be constructed!

The ants who act as sculptors work in wood. The red ants of the forest build storied houses in trees with pillars for support. There is a little

brown ant which makes a house forty stories high; half the rooms are below ground. There are pillars, buttresses, galleries, and various rooms with arched roofs. This ant works in clay. If her material becomes too dry she is compelled to wait for moisture.

The blind ant is a remarkable builder. She makes long galleries above ground. She does not use cement as some ants do, so she builds rapidly and her structure is flimsy.

The Saiiva ants of Brazil are skillful masons. They construct chambers as large as a man's head that have immense domes, and outlets seventy yards long. The Brazilians say that the Indians, in cases of wounds, when it was necessary to close them as with stitching, used the jaws of the Saiiva ant. The ant was seized by the body and placed so that the mandibles were one on each side of the cut. Then, when pressed against the flesh, the ant would close the mandibles and unite the two sides of the cut as firmly as a good stitch would do it. A quick twist of the ant's body separated it from the head. After a few days the heads were removed with a knife and the operation was complete.

In view of this we are tempted to say that ants are also *surgeons*, but die themselves instead of having their patients do so!

A friend who has lived long in Brazil tells me that the Saiiva ants are so large the nuns in the convents use their bodies to dress as dolls, making them represent soldiers, brides and grooms, and so forth.

One species of ants do nothing except capture slaves. These are not able to make their own nests, to feed their larvæ, or even to feed themselves, but are so helpless they would die if neglected by their servants. There are three species that keep slaves, but these are not the only ones who go to war, as the usually peaceful agricultural ants sometimes get short of seed and go forth to plunder each other's nests.

It is stated that a thousand species of ants are known. No doubt there is much of interest about each kind. The "Driver Ant" is so choice of time and

labor that, when building its covered roads, if a crevice in a rock or a shady walk is reached, it utilizes these, then continues arching its path as before. If a flood comes these ants form into large balls with the weak ones in the middle, the stronger on the outside, and so swim on the water.

The ant benefits man by acting as a scavenger, by turning up the subsoil, and in various other ways. But flowers prefer the visits of moths and butterflies; as ants are of no service to them in scattering pollen, they do not wish them to get their honey. Some of the flowers have found out that ants, though so industrious by reputation,

are lazy about getting out early in the morning for they dislike the dew very much. Hence by 9 o'clock these wary flowers have closed their doors. Others take the precaution to baffle ant visitors by holding an extra quantity of dew on the basins of their leaves, while still others exude a sticky fluid from their stems which glues the poor ants to the spot.

Campanula secretes her honey in a box with a lid. Cyclamen presents curved surfaces, while narcissus makes her tube top narrow. Other flowers have hooks and hairs by which the ants are warned to seek their honey elsewhere.

THE CHARITY OF BREAD CRUMBS.

THE recent "cold wave," which with its severity and length has sorely tried the patience of Denver's citizens, has had its pleasant features. Perhaps chief of these has been the presence in our midst of scores of feathered visitors driven in, doubtless, by pangs of hunger, from the surrounding country.

Flocks of chickadees have flown cheerily about our streets, chirping and pecking industriously, as if to shame those of us who lagged at home because of zero temperature. They were calling to one another as we stood at the window watching them last Saturday morning.

Suddenly, down the street with the swiftness and fury of an Apache band, tore a group of small savages, each armed with a weapon in the shape of a stick about two feet long.

"What can those boys be playing?" inquired someone, and the answer to the question was found immediately as in horror she saw the sticks fly with deadly exactness into a group of the brave little snowbirds, and several of them drop lifeless or flutter piteously in the frozen street.

"How can boys be so heartless!" said

the lady, rising in righteous wrath to reason with them.

"Thoughtless is nearer the truth," remarked a friend who had witnessed the scene. "Their hearts haven't been awakened on the bird question and it would be better to try and stir up their mothers and teachers than to fuss at the boys themselves."

But the Denver birds have plenty of friends and this has been proved many times during the past week.

At the surveyor-general's office Saturday morning there was held a large reception at which refreshments were served and the guests were largely house finches—small, brown birds with red about their throats. For a number of seasons the ladies and gentlemen employed there have spread a liberal repast several times each day upon the broad window ledges for these denizens of the air. The day being very cold, someone suggested that perhaps if the window were opened and seed scattered inside also, the birds would come in and get warm.

The feast was arranged with bits of apple, small cups of water, and a liberal supply of seed. And the invitation was accepted with alacrity. A swarm of

busy little brown bodies jostled and twittered and ate ravenously of the viands provided, while thankful heads were raised over the water cups to let that cool liquid trickle down thirsty throats. It was a lovely sight and everyone in the room kept breathlessly still, but at last some noise outside alarmed the timid visitors and they whirled away in a small cloud, leaving but a remnant of the plenteous repast behind.

Several of the tiny creatures becoming puzzled flew about the room in distress, trying to get away, and one little fellow bumped his head violently against a glass and fell ignominiously into a spittoon. He was rescued and laid tenderly on the window sill to dry, a very bedraggled and exhausted bit of creation. It was interesting to watch the effect of this disaster upon every one in the office, including Mr. Finch himself.

Gentlemen and ladies vied with each other in showing attentive hospitality to the injured guest. He had his head rubbed and his wings lovingly stroked, and being too ill to resent these familiarities, he soon became accustomed to them. He was finally domiciled in a small basket and grew very chipper and tame indeed before his departure, which was after several days of such luxury and petting as would quite turn the head of anything less sensible than a finch.

It is said the gentleman who makes these birds his grateful pensioners buys ten pounds of seed at a time, and another gentleman and his wife, who reside at the Metropole, deal out their rations with so lavish a hand that their windows are fairly besieged with feathered beggars clamoring for food.

In a neighbor's yard I noticed always a small bare spot of ground. No matter how high the snow might drift around it, this small brown patch of earth lay dark and bare.

"Why do you keep that little corner swept?" I inquired.

"Oh, that is the birds' dining-room," was the answer, and then I noticed scraps of bread and meat and scattered crumbs and seeds. And as many times as I may look from my windows I always see from one to five fluffy bunches at work there stuffing vigorously.

Many of our teachers have made the lot of our common birds their daily study and delight. In the oldest kindergarten in the city the window sills are raised and the birds' food scattered upon a level with the glass, so that every action of the little creatures can be watched with ease by the children within.

In numbers of homes and in many of our business offices the daily needs of our little feathered brothers are thoughtfully cared for.

Let this feeling grow and this interest deepen in the hearts of Denverites, especially in the children's hearts. It will make this city a veritable paradise as the summer approaches, "full of the song of birds." It will make of it a heaven in the course of time, for not only the humble finch and snowbird, but for nature's most beautiful and aristocratic choristers.

"To-day is the day of salvation." To-day is the very best day of the best month in which to consider the needs of these poor which, thank God, "we have always with us."—*Anne C. Steele, in Denver Evening Post, Feb. 3, 1899.*



THE HOODED MERGANSER.

(*Lophodytes cucullatus*.)

LYNDS JONES.

EVEN the merest tyro in bird study need have no fear of confusing the male of this species with any other bird, as a glance at the picture will make evident. No other bird can boast such a crest, and few ducks a more striking pattern of dress or a more stately manner. The species inhabits the whole of North America, including Cuba, occasionally wandering to Europe and rarely to Greenland. It is locally common and even abundant, or used to be, in well watered and well wooded regions where fish are abundant, but seems to be growing less numerous with the advance of settlements in these regions. The food consists of fish, mollusks, snails, and fresh water insects which are obtained by diving as well as by gleanings.

The winter range of this "fish duck" is largely determined by the extent of open water on our lakes and streams. Thus it is regularly found in Minnesota wherever there is open water, even during the severest winters, but under other conditions it may be absent from regions much farther south. There can be little doubt that a large proportion of the individuals pass the winter well south, only a few being able to find subsistence about the springs and mouths of streams in the northern states.

Is it entirely due to individual taste, or may it be a difference in the food habits of these birds in different parts of the country that their flesh is highly esteemed in some regions but will scarcely be eaten at all in others? If it is true that the Michigan individuals eat snails, crabs, and mollusks rather than fish, and are therefore excellent for the table, while the California ones prefer fish and are therefore not fit for food, why have we not here a clear case of tendency to differentiation which will ultimately result in a good subspecies?

The nesting of the hooded merganser is even more erratic than its occurrence.

It has been found nesting in Florida as well as in the more northern parts of the country, and here and there throughout its whole range, being apparently absent from many regions during the nesting season. It is unlike the other "fish ducks" in preferring still water and secluded streams, but resembles the wood duck in building its nest a short distance from the water in a hollow tree or stump or on the flat side of a leaning or fallen tree, often forty or more feet from the ground. The nest consists of weeds, leaves, and grasses with a soft lining of feathers and down. This warm nest must be intended to act as an aid to incubation rather than as a warm place for the young ducks, since they, like other ducks, are carried to the water in the beak of the mother-bird shortly after they are hatched. The nest complement ranges from six to eighteen eggs, the average being about ten. The eggs are variously described by different authors, both as regards color and size, from pure white, pearly white, creamy white, buffy white to buff-colored, and from 1.75 x 1.35, to 2.25 x 1.75 inches. The average size is probably nearly 2.10 x 1.72.

The downy ducklings are brown in color and, as they skim over the water, their pink feet churning up a spray behind, they present a bewitching picture. The male bird, like other ducks, assumes no share of the labors of incubation, but entertains himself hunting fish in some solitary stream where food is plentiful, and in proper season returns to assume the duties of the head of his lusty family.

The nesting season must necessarily vary greatly with locality. In Minnesota fresh eggs are found during the third week of April, according to Dr. P. L. Hatch. The date would probably be much earlier with the Florida birds. The locality selected for the nest is also variable with the different parts of the country.

The manner of flight of the different species of ducks is usually characteristic to the eye of the careful student. Thus the hooded mergansers fly in a compact flock of about a dozen birds with a directness and velocity that is wonderful. Dr. Hatch says, in his "Birds of Minnesota:" "Once in January, 1874, when the mercury had descended to 40 below zero, while a north wind was blowing terrifically, I saw a flock of six of this species flying directly into the teeth of the blizzard at their ordinary velocity of not less than ninety

miles an hour." This may sound rather strong to some, but their flight is certainly very rapid, as any gunner will testify.

The "fish ducks," or mergansers, are an interesting group of three American species, of which the hooded is the smallest. The long, slender, toothed or serrated bill of this group provides a field character which will serve to identify them at a glance. It is to be hoped that their habit of feeding largely upon fish will prove a protection from entire extermination.

THE TRUMPETERS.

The winds of March are trumpeters,
They blow with might and main,
And herald to the waiting earth
The Spring and all her train.

They harbinger the April showers,
With sunny smiles between,
That wake the blossoms in their beds,
And make the meadows green.

The South will send her spicy breath,
The brook in music flow,
The orchard don a bloomy robe
Of May's unmelting snow.

Then June will stretch her golden days,
Like harp-strings, bright and long,
And play a rich accompaniment
To every wild bird's song.

The fair midsummer time, apace,
Shall bring us many a boon,
And ripened fruits, and yellow sheaves
Beneath the harvest-moon.

The golden-rod, a Grecian torch,
Will light the splendid scene,
When Autumn comes in all the pomp
And glory of a queen.

Her crimson sign shall flash and shine
On every wooded hill,
And Plenty's horn unto the brim
Her lavish bounty fill.

—Andrew Downing.

CLOVES.

(*Eugenia caryophyllata* Thunberg.)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

Biron—A lemon.

Lang—Stuck with cloves.

—*Shakespeare, Love's Labor Lost, V. 2.*

CLOVES are among our favorite spices, even more widely known and more generally used than ginger. They are the immature fruit and flower-buds of a beautiful aromatic evergreen tree of the tropics. This tree reaches a height of from thirty to forty feet. The branches are nearly horizontal, quite smooth, of a yellowish grey coloration, decreasing gradually in length from base to the apex of the tree, thus forming a pyramid. The leaves are opposite, entire, smooth, and of a beautiful green color. The flowers are borne upon short stalks, usually three in number, which extend from the apex of short branches. The calyx is about half an inch long, changing from whitish to greenish, and finally to crimson. The entire calyx is rich in oil glands. The petals are four in number, pink in color, and drop off very readily. The stamens are very numerous. All parts of the plant are aromatic, the immature flowers most of all.

The clove-tree was native in the Moluccas, or Clove Islands, and the southern Philippines. We are informed that in 1524 the Portuguese took possession of these islands and controlled the clove market. About 1600 the Dutch drove out the Portuguese and willfully destroyed all native and other clove-trees not under Dutch protection. The plan of the Dutch was to prevent the establishment of clove plantations outside of their own dominions, but in spite of their great watchfulness other nations secured seeds and young plants and spread the cultivation of this valuable spice very rapidly. Now cloves are extensively cultivated in Sumatra, the Moluccas, West Indies, Penang, Mauritius, Bourbon, Amboyne, Guiana, Brazil, and Zanzibar—in fact throughout the tropical world. Zanzibar is said to supply most of the cloves of the market.

The cultivation of cloves in Zanzibar is conducted somewhat as follows: The seeds of the plant are soaked in water for two or three days or until germination begins, whereupon they are planted in shaded beds about six inches apart, usually two seeds together to insure against failure. The young germinating plants are shaded by frameworks of sticks covered with grass or leaves. This mat is sprinkled with water every morning and evening. The young plants are kept in these covered beds for nine months or one year, after which they are gradually hardened by removing the mat from time to time, and finally left in the open entirely for a few months, after which they are ready for transplanting.

Transplanting must be done carefully, so as not to injure the roots. The plant is dug up by a special hoe-like tool, lifted up in the hand with as much soil as possible, placed upon crossed strips of banana fibres, which are taken up by the ends and wrapped and tied about the plant. The plant is now carried to its new locality, placed in a hole in the soil, the earth filled in about it, and finally the banana strips are cut and drawn out.

The transplanted clove plants are now carefully tended and watered for about one year, but they are not shaded as during the first year of their existence. Usually many of the transplanted plants die, which makes replanting necessary. This great mortality, it is believed by some, might be reduced very materially by shading the recently transplanted clove-trees for a time.

The clove tree may attain an age of from 60 to 70 years and some have been noted which were 90 years old and over. The average life of the plantation clove-trees is, however, perhaps not more than 20 years. The trees be-

gin to yield in about five years after planting. The picking of the immature flowers with the red calyx is begun in August and lasts for about four months. From two to four crops are harvested each year. Each bud may be picked singly by hand, but those of the higher branches are more generally knocked off by means of bamboo sticks. After picking the flowers are placed upon grass mats and dried in the sun, this requiring from six to seven days. In the night and during rains they are placed under cover. Drying changes the red color of the calyx to a dark brown. The dried cloves are packed in gunny bags and carried to Zanzibar where an internal revenue of 25 per cent. is paid in cloves. From Zanzibar the cloves are exported in mat bags.

We know that cloves were used by the ancient Egyptians, for a mummy has been found with a necklace of them. The Chinese used them extensively, 226 B.C. Plinius briefly described "*Caryophyllon*," which, according to some commentators, referred to cloves and according to others to cubeb. Cloves appeared in Europe about 314-335 A. D., evidently introduced by way of Arabia. Emperor Constantine, who ruled about that time made Pope Sylvester of Rome, among other things, a present of 150 pounds of cloves. In Grecian literature cloves are first mentioned about the Sixth century. Trallianus recommended them in stomach troubles and in gout.

The Germans designate cloves as *Gewürznägelein*, which means spice nails, because of their resemblance to a nail, the corolla forming the head and the calyx tube the nail. The aromatic odor and pungent aromatic taste is due to an ethereal oil present in large quantities (18 per cent.) in the calyx tube. This oil is used for various purposes; as a clearing reagent in micro-technique, for toothache, as an antiseptic, stomachic, irritant. It destroys insects and keeps them away. When freshly extracted its color is pale amber but it gradually assumes a reddish brown coloration. It is one of the least volatile of ethereal or essential oils. It is also used by soapmakers and perfumers.

Cloves are variously used as a spice. They are often stuck into pickled fruits, as peaches, apples, apricots. The opening quotation from Shakespeare suggests such a use with lemons. Some persons acquire an inelegant and undesirable habit of chewing cloves. The pungent oil deadens or benumbs the nerves of taste and touch and the persistent mastication of cloves, is said to produce an excessive development of fibrous tissue of the liver, a condition akin to "nutmeg liver" which shall be referred to in our next paper.

Other parts of the clove tree are also used occasionally, as for instance the flower stalks known as clove stalks. They possess the odor and taste of cloves but in a lesser degree. Formerly the leaves were also used but it is said that they do not now appear in commerce. The dried fruit known as mother of cloves is used more or less. They contain far less oil than cloves and are comparatively less valuable. Even the wood of the tree has been used as a spice. The dried and ground flower stalk, the fruits and the wood are often used to adulterate ground cloves. We would therefore advise housewives to purchase the cloves and grind them at home. It is reported that cloves have been adulterated with false cloves made from starch pressed into the form of cloves and roasted. It is, however, not at all likely that such a practice is carried on to any great extent. Sometimes cloves are placed on the market from which the oil has been extracted.

The cultivated cloves are richer in essential oil than the native cloves. The Zanzibar cloves are quite large. The principal market varieties are English cloves, Amboine cloves, Bourbon cloves, Cayenne cloves, Zanzibar cloves, and others.

EXPLANATION OF PLATE.

4, flowering branch, nearly natural size; 1, floral bud; 2, floral bud in longitudinal section; 3, stamens; 4, pollen grains; 5, ovary in transverse section; 6, fruit, about natural size; 7, fruit in transverse section; 8, embryo; 9, part of embryo.



CLOVE.

A VEIN OF HUMOR.

ELANORA KINSLEY MARBLE.

NOT only human beings, it is said, but all other animals of earth, air, and water have their play spells. To the question of how man can know this, one can only say that man being also animal, must certainly understand something of the nature of his lower brethren. Our mental composition is of the same substance as theirs, with a certain superstructure of reasoning faculty, however, which has enabled us to become their masters. The various emotions and faculties, such as love, fear, curiosity, memory, imitation, jealousy, etc., of which man boasts, are to be found, often in a highly developed state, among the lower animals, so that it is not at all surprising that among both birds and mammals we find individual species possessing a more or less keen sense of humor.

The question of why animals play is by no means new to philosophical inquiry. Herbert Spencer says animals play in their early or youthful stage of life because of their "surplus energy," the same reason that we ascribe to the child, referring more particularly to the strictly muscular plays, in contradistinction to vocal recreation. An eminent philosopher, however, disagrees with him in this, contending that play in animals is not a mere frolicksome display of surplus energy, but a veritable instinct and a matter of serious moment as well as necessity.

However that may be, the fact remains that they do play and, as the writer can aver, in a spirit not at all serious, but with all the happy abandon of a child.

Among the wags of the feathered tribe the mockingbird and blue jay deserve special mention, though the raven, crow, catbird, jackdaw, and magpie may, from the point of mischief, be numbered in the list. In looking at the ungainly pelican one would smile to hear him called a "humorist," but as the seal is the buffoon of the aquarium,

so the pelican plays the part of the clown in the zoo. His specialty is low comedy and generally the victims of his jokes are the dignified storks and the rather stupid gulls, companions in captivity. The stork's singular habit of standing on one leg affords the pelican a rare chance for a little fun, so he watches until a stork, in a meditative mood, takes up his favorite attitude beside the tank. Then up waddles the pelican and, with a chuckle, jostles against him, and sends him tumbling into the water. It is a question whether the stork enjoys the sport, but the pelican evidently does, for he leaps about evincing the utmost delight, flapping his wings, and squawking, or laughing, in triumph. The gulls he treats in a different fashion. No sooner does he see one seize a piece of bread, or some dainty contributed by a spectator, then up he rushes with a squawk and prodigious flapping of wings, forcing the gull to take refuge in the water, while he with much satisfaction devours the morsel.

"Our Animal Friends" tells of a pelican who made friends with a tiny kitten. When in a lively mood the pelican, perhaps recalling how his parents, or himself, in a wild state, were wont to catch fish, would pick up the kitten, toss it in the air, and stand with his huge mouth wide open as if intending to catch it as it came down. Puss seemed to consider it excellent fun, as with a quick motion she turned over in the air, alighting every time uninjured upon her feet; then off she would scamper to the pelican, running about his long legs as though seeking to knock him down. Watching his opportunity he would grasp her again, toss her into the air, and thus the sport would go on till the bird himself tired of it.

The mockingbird, that prince of song and mimics, possesses a sense of humor highly diverting and very humanlike—the male bird that is, for the female

views life from a more serious standpoint, her domestic duties, it would seem, weighing heavily upon her mind. We speak of the "thieving" instinct of this bird, as well as of the blue jay, and other kindred species, because of that mischievous spirit which leads them to seize any small bright article which comes in their way, and, when unobserved, to secrete it. That they never purloin or hide these objects when observed is thought to be proof conclusive that it is done from the pure love of stealing and nothing else.

"I hide and you seek." In that childish game does not the one who is to secrete the article insist that the "finder" close his eyes till the object sought is carefully hidden? What amusement would be afforded the jay, or the mockingbird, should he attempt to secrete an article while you are looking? If we could only interpret the sparkle in their bead-like eyes, as we can that in a child's when engaged in the same game, how much mischief we would read there as the owner of these secreted articles hunts "high and low" for them in presence of the fun-loving birds!

"Where did you hide it, Jay?" pleaded a lady, who had left her silver thimble upon a table, and after a few minutes' absence returned to find it gone. "There has been nobody in the room since I left, so you must have taken it."

Mr. Jay, the pet of the household, hopped into his cage, and, standing upon his perch, looked demurely at the questioner.

"You are a naughty bird," said his mistress, who had in remembrance finger-rings, watch-keys, collar-buttons, and similar articles, which, from time to time, had as mysteriously disappeared, "and I am going to shut you in," which she did, fastening the insecure door of his prison with a stout piece of string.

Jay gave a shrill shriek, as of laughter, when his mistress continued the search, turning up the edge of the carpet, searching the pockets of garments hanging on the wall, anywhere, everywhere, that articles, one-time missing, had been secreted. But look where

she would the thimble could not be found.

A month went by, and still Jay remained an unwilling, if not a subdued, prisoner. As his mistress one morning sat sewing in the room, Jay gave a final peck at the string which confined him, and at once, without a word, hopped to a chair from which one rung was missing. His mistress was watching him, and to her intense amusement saw him very deftly extract from the hole in the leg her lost thimble.

In the same household came, as visitor, a little boy named Johnny, of a very peevish and fretful disposition. When refused anything he especially desired, the whole house was made to resound with shrieks of: "Ma, ma, ma-a-a-a!"

Jay listened very attentively at first, but in a few days had not only caught the words but the very intonation. Johnny never entered the room without the bird crying in a peevish tone, in a very ecstasy of mischief: "Ma, ma, ma-a-a!"

"I hate that bird," said the boy one day, when Jay had greeted him with an unusually whining cry: "He ought to be killed. He makes me nervous."

"Then I would stop whining if I were you," suggested his mother, and Johnny wisely concluded he would.

A mockingbird which frequented the grounds of a gentleman in Virginia was noted not only as a most mischievous fellow, but as one of the most divine songsters of his tribe. So heavenly was his music, and so superior to that of his fellows, that at eventide in the general chorus his voice soared above all the rest. Men, women, and children gathered—for his fame had traveled far and near—to hear him sing, but in the very midst of his divine strains, Jip—for so they named him—would suddenly cease, and flying away, conceal himself behind a chimney on the housetop. Presently he would sneak down to the eaves and peer cautiously over, to see if his self-invited audience had scattered. If they were still there he would again hide himself, returning shortly to peer over the eaves again. As soon as the back of his last auditor was visible down he

would fly to his chosen perch and resume his glorious song, tempting his audience to return. This time he would regale them with the choicest of his trills, breaking off in the midst as before and mischievously flying away to hide himself. This little comedy he would repeat three or four times during an afternoon or a moonlight night.

A black cat of the household was a recipient of his practical jokes. When she was passing Jip found it exceedingly amusing to spring upon her back, give her a sharp dig with his beak, and then spring nimbly to a low branch, exulting over the cat's vain effort to locate her tormentor.

A favorite joke of a mockingbird in Richmond, Va., was, when espying a dog, to utter a shrill whistle in exact imitation of a man summoning that animal. Thus peremptorily called, the canine would suddenly halt, prick up his ears, look up and down the street, then, seeing no master, trot on his way. Again the bird would whistle, but in a more mandatory tone than before. The dog would stop, gaze about in a puzzled manner, then, in response to another whistle, dash forward in the direction of the sound. The mystification of the dog appeared to afford the mockingbird the most delight, more particularly when not only one dog, but several would collect under his cage, whining and barking, vainly seeking to locate their masters.

Among the mammals, the elephant, in general estimation, possesses the drollest sense of humor. The writer never will forget the mischievous pranks of a huge fellow among a herd of elephants tethered in a pen in Central Park, New York. Only those beyond his reach escaped his teasing, his sinuous trunk tickling those near, now here, now there, his little pig-like eyes twinkling with genuine humor. His companions did not respond in kind, not feeling perhaps in a playful mood, which fact seemed in no way to diminish the big fellow's amusement, for he continued the sport at intervals much to the edification of the spectators.

Even when engaged in piling up huge slabs of lumber in the sawmills in India, these huge animals while away the tedious hours of labor by many a little prank or joke at the expense of their drivers. A favorite one is, after disposing of one load and returning for another, to fill their trunks with odds and ends as they move leisurely along, a stray nail, three or four pebbles, a tuft of grass with a bit of earth still clinging to its roots, a discarded cheroot, or other small articles which may lie in their paths. These are collected, and when the trunk is packed to their satisfaction, quietly curled upward and the mass blown against the naked stomachs of the drivers dozing upon their backs.

TAMING THE SMALLER WILD ANIMALS.

ALDA M. MILLS.

THERE is a great difference in the dispositions of the small wild animals, some quickly responding to care and petting, while others seem incapable of being tamed. It is the same with birds. I have found owls, hawks, and other species very easily tamed, while prairie chickens and quail appear to be inca-

pable of domestication even in a small degree. They will lose considerable fear of human beings if left in their freedom to become accustomed to their near approach, but if placed in captivity they pine away and die, or, finding some avenue of escape, wander away and are lost. The nearest approach to domestication in the prairie

chicken tribe I ever noted, was that of a young bird that grew up with a flock of young turkeys. We noticed it among the turkeys when they were quite small. The prairie chicken must have been considerably older than the turkeys, as at first it was larger than they were, but they rapidly gained on it and were soon much the largest. However, the little wildling clung to its adopted family and in the fall, when the turkeys came and roosted in the plum trees near the buildings, it came too and after a time lost most of its shyness and, strangest of all, adopted the turkeys' mode of roosting in the trees. Later on, however, it disappeared, probably joining a flock of its own kind.

The common striped ground-squirrel is very easily tamed if taken while young and will soon learn to come if called by name, and will learn many little tricks. The gray squirrels, though much prettier than the striped ones, are naturally shyer and harder to tame. Rabbits of the several species inhabiting the United States are capable of domestication in a degree, though of all I ever owned but one would return at my call when allowed its liberty out-of-doors. Western jack-rabbits when young make most interesting and beautiful pets, and, while confined, seem to lose all fear. Notwithstanding their prettiness and their soft cuddling ways, they are stupid little things, all their knowledge seeming to come through the calls of their appetites.

Minks and weasels have too fierce a nature to accept domestication, and, so far as I have observed, show not the slightest degree of affection for the one who feeds them. That odorous animal, the skunk, however, is very susceptible to kindness, and will become as tame and tractable as a pet dog. One of the most interesting pets I ever had was a skunk taken when very young. It was allowed its full freedom and would follow me around, come at my call, do many little tricks

at command, and was as playful as a kitten. Being thoroughly tamed it did not make use of its objectionable means of offense and defense, though when frightened it often "threatened" to. As in the case of the prairie chicken, my pet skunk also disappeared when it was nearly grown, thinking, perhaps, that it could make a better living for itself than I could furnish it. Its favorite food was insects such as May-beetles and their larvæ, grasshoppers, and almost every kind of bug, worm, or beetle; even hairy caterpillars were devoured after being rolled or moulded with its paws to rub off most of the hairs. This little pet of mine was never troubled with dyspepsia or indigestion and crammed its capacious stomach with a vast amount of food—mostly insects—though small mammals, eggs, birds, and once a young chicken were devoured with relish. Mice of many species can be tamed to some extent though I have found one of the shyest species when in a wild state to be the most readily and thoroughly tamable. I refer to the deer mice. They are pretty, yellowish brown creatures, white underneath, and have large, dark, brilliant eyes and erect ears giving them a very handsome expression. Their hind legs are much longer and stronger than those of the ordinary mouse and they are capable of making extraordinary leaps like the animals from which they get their common name.

When tamed they will learn little easy tricks such as sitting erect and "begging" for food, coming when called by name, etc., and are not so ready to use their teeth on the slightest provocation, as are their cousins, the blue field mice.

By making pets of wild animals much can be learned of their habits, dispositions, and characteristics. Especially their food habits, which, in the wild state, exert so much influence in the economy of nature as checks to the undue increase of other species of animals, insects, or plants.



VERY similar in its bodily structure to the marmot, of which it is said to be the nearest American relative, is the woodchuck or ground-hog (*Arctomys monax*). It is about eighteen inches in length, including the tail. The body is stout, the head broad and flat, the legs short and thick, the fur blackish or grizzled on the upper portion and of a chestnut red on the under surface of the body.

The ground-hog is found in all parts of the region extending from the Atlantic coast west to the Missouri, Iowa, and Minnesota. It inhabits woods, prairies, and meadows, lives on roots, vegetables, and herbs, and is especially fond of red clover. Its burrows are large excavations, and in the early autumn it busies itself in storing provisions for its long winter retreat. It is said to be one of the first hibernating animals to retire to winter quarters and one of the earliest to come forth in the spring, the length of its retirement varying with the locality, and being shorter in the south than in the north. In the northern United States it usually retires about the first of October and reappears about the middle of March. A recent writer and close observer says that woodchucks hibernate in pairs, but he never knew one of these proverbially sleepy creatures to leave its hole until warm weather came—in spite of the alleged practice it has of coming out invariably on the second day of February to fix the weather for the rest of the winter. He took the trouble once to dig into a woodchuck's burrow on a Candlemas day—and a warm, cloudy day it was; just such a day as the ground-hog is said to choose to come out of his hole and stay out. He found two woodchucks in the burrow, with no more sign of life about them than if they had been shot. From all outward appearances he could have taken them out and had a game of football with them without their knowing it. When the animal begins its hibernation it carefully closes the entrance to its burrow. Dr. Bachmann, who had marked a burrow to which he knew a pair of woodchucks had retired,

caused it to be opened early in November, and found the two animals, perfectly dormant, lying coiled up close together in a nest of dry grass, twenty-five feet from the entrance.

The young woodchucks, of which there are from four to six in a litter, are born about the end of April. The mother takes tender care of them until they are able to shift for themselves.

The woodchuck, when taken young, is easily tamed, and becomes an interesting pet. The little animal can be taught to come when called, to run for food when whistled to, and to answer to a name. One called Chuck was very fond of bread spread with butter and sugar. If plain bread were offered to him he would taste it, make a wry face, spit out the bit in his mouth, and throw away the piece he held, and then he would straighten himself up and hold out his shining black hands for bread *with sugar* on it. He always sat up stiffly on his hind legs when eating, and it was a comical sight to see him holding a long banana in his arms, until he had eaten the whole of it, blinking his bright black eyes with satisfaction. Chuck was taught many tricks, to balance a stick on his nose, swing in a trapeze, draw a toy cart, and the like. He was very affectionate and tractable.

Early in September Chuck began to eat voraciously and soon became very fat, but in the first week in October his appetite failed; he ate at first once a day, then once in two days, and after awhile he became quite restless and stupid. He was given his liberty, and watched closely to learn his habits. He began gnawing grass, gathering dry leaves and tucking them in various corners. At length he found a place that suited him to dig, and then he began making his nest. When the excavation was complete Chuck disappeared for several days. One evening he tapped on the kitchen door. When the door was opened he ran to a basket of apples and ate one, then ate a slice of bread and sugar. He appeared crazy with haste, and as soon as he was through eating he scampered off, to be gone a long time. On the first day of February Chuck crept out

of his hole, and sat for a moment in the sun. Before he could be reached, however, he had returned to it. In six weeks and three days he again came out, and what was surprising, he did not appear to have forgotten any of

his friends, of whom he had many among the cats, dogs, and rabbits of the neighborhood, trotting about among them on his hind legs. A cruel boy and a savage dog ended the life of this harmless little animal. C. C. M.

FLOWERS WITH HORNS AND CLAWS.

E. F. MOSBY.

THE milkweed is best known to most of us by its pods—long, rough cases, packed close with shining white silk attached to little brown seeds. The lightest wind that blows can carry these a stage or two on their journey with such lovely silken sails. But perhaps everyone has not noticed one rather strange thing about them. Almost always there are two pods, one vigorous of growth, large and full; the other stunted and ill-formed. They are like the two brothers or sisters of Fairy Tales, one fair and well-favored and gracious, the other ill-grown and dwarfish. But *why* this is so, is one of the many secrets of the milkweed.

It is quite a large family of flowers, or weeds, as you may choose to call them. There is the gorgeous orange-colored butterfly weed, always surrounded by hovering or fluttering butterflies, most of them also orange or yellow in their coloring; the fragrant, rose-colored milkweed of June, the purple milkweed and its cousin of the marsh. But it is the common milkweed that is called the horned herb. It was once thought possessed of many healing virtues when the business of gathering and drying herbs was more important than it is now. Yet one needs no idea of this kind to look with interest on this curiously formed plant which grows in such profusion by the dusty roadside or by our very doorstep. A milky juice exudes from the stem whenever a flower is gathered, and the pollen is in such sticky masses that a feeble insect is often caught and cannot escape with its fatal treasure.

The blossom cluster, reflexed so oddly, is pretty and quaint at first sight, but as we look deeper we find some unknown law of fives has ruled its structure—the recurved calyx is five-

parted, so too the deeply recurved corolla; five stamens there are surrounding, like a circle of courtiers, a fairy king and queen, the two pistils in the center, above which hangs "a large five-angled disk," an awning of state. But oddest of all is the crown of five-hooded nectaries above the corolla, each nectary enclosing *an incurved horn*. Is not this a strange honey-cup with the horn concealed under the silky flower-hood? The insects love the banquet thus spread for their delight and no doubt they know the secrets of the blossom.

There is another family of wild flowers that abounds in horns and claws, especially the latter—the large crowfoot family. The hook-beaked crowfoot has little one-seeded fruits with long and hooked beaks, like those of birds of prey, collected into a head. The wild columbine, nodding so merrily from the high rocks, and the larkspur, have hooked spurs and claws and the larkspur hides its long spurs in its calyx. But the monk's-hood is the more interesting of all.

In early days, before stamens and pistils are ready for open air and wandering insects or pattering showers, you may find a dark blue bud in the meadow. The calyx is large and showy and blue like a flower, and its curved front sepals close the entrance before while the hindmost sepal, like a soldier's helmet, or a monk's hood, comes down over all as a covering. Then the sun shines and the blossom ripens and it is time to open.

Wide fly the little doors, back falls the blue hood, and the golden heart of stamens and pistils is ready with a welcome. But where are the petals? Hidden under the hood are two tiny hammer-like claws, the only petals this flower possesses.

THE COMMON AMERICAN MOLE.

THIS mole (*Scalops aquaticus*) is the most common species in the eastern portion of the United States. Moles are considered as animals of a fairly high order, on account of their forelegs' being developed into perfect scoops for digging. They live almost entirely in underground retreats, where they lead a very peculiar life. They are found over nearly all Europe, a great part of Asia, southern Africa, and North America, and their habits are in almost every respect similar. Their varieties are not numerous, but it is possible that there are still a great many species as yet unknown to naturalists. They are all shaped and endowed, says Brehm, in so striking a manner as to be instantly recognizable. The body is stout and of cylindrical shape, and merges into a small head without the intervention of a distinct neck. The body is supported on short legs; the forward pair appear to be relatively gigantic digging tools, while the hind limbs are longer and resemble those of the rat. The teeth are from thirty-six to forty-four in number.

Moles all delight in fertile plains, though they are also found in mountains. As the effect of light is painful to them, they seldom come to the surface, and even in the depth of the earth they are more active by night than by day. Their movements in their underground passages are much more rapid than when on the surface of the ground, where they can scarcely walk. They are also good swimmers when compelled by necessity to resort to the water.

Of the senses of the moles it is said those of smell, hearing, and touch are especially well developed, while that of sight is deficient. All moles are quarrelsome, are addicted to vicious biting, and they take pleasure in devouring their own kind. They eat only animal food, all kinds of insects living under ground, worms, and the like, though they also feed on small mammals and birds, frogs, and snails. They are exceedingly voracious, and as they can endure hunger only for a

very short time, they do not hibernate. They are undoubtedly useful as exterminators of insects, though on account of their digging habits they are considered a nuisance by the farmer.

It was long thought that moles were blind, or had no eyes. The eyes, however, are about the size of a small seed, lie midway between the tip of the snout and the ears, and are completely covered with the hair of the head. They are protected by lids, and may be projected or retracted at will.

Once or twice a year the female mole gives birth to from three to five young. They grow rapidly, and remain with the mother for one or two months. Then they begin digging on their own account and require no further attention. They have been found to be very difficult to keep in captivity by reason of their insatiable appetite.

As the mole is obliged constantly to construct new hillocks in order to secure its food, it cannot long hide itself from its enemies. It digs horizontal shafts at a slight depth from the surface, and in order to remove the earth it has dug up, it throws up the well known hillocks. Many a beautiful lawn has been nearly ruined by the handiwork of this little creature, who likes to bore its snout into loose soil and throw it backward with its powerful forepaws. In a single night it can undo much of the labor of the gardener. In loose ground the animal is said to work with really admirable rapidity. Oken kept a mole in a box of sand for three months, and observed the animal work its way in it nearly as rapidly as a fish glides through the water, snout foremost, using the forepaws to throw the sand to the side and the hind limbs to push it backward. Lecourt, wishing to investigate the speed of a mole in its conduits, set up in a row a number of heavy straws in the main conduit, arranged so that the mole could not run along the passages without touching them. To the tops of these straws he fastened small paper flags, and when the mole was occupied in its hunting ground, he frightened it with the sound of a bugle, and thus

caused it to run into the main conduit. Then the little flags fell down one after another, the instant the mole touched them, and the observer and

his assistants had an opportunity to correctly record the speed of its course for a short distance. C. C. M.

THE OAK.

What gnarled stretch, what depth of shade is his!
There needs no crown to mark the forest's king;
How in his leaves outshines full summer's bliss!
Sun, storm, rain, dew, to him their tribute bring,
Which he, with su h benignant royalty
Accepts, as overpayeth what is lent;
All nature seems his vassal proud to be,
And cunning only for his ornament.

* * * * *

So, from oft converse with life's wintry gales,
Should man learn how to clasp with tougher roots
The inspiring earth—how otherwise avails
The leaf-creating sap that sunward shoots?
So every year that falls with noiseless flake,
Should fill old scars up on the stormward side,
And make hoar age revered for age's sake,
Not for traditions of earth's leafy pride.

—Lowell.

“Had I wist,” quoth Spring to the swallow,
“That earth could forget me, k’ssed
By summer, and lured to follow
Down ways that I know not, I,
My heart should have waxed not high,
Mid-March would have seen me die,
Had I wist.”

“Had I wist, O Spring,” said the swallow,
“That hope was a sunlit mist,
And the faint, light heart of it hollow,
Thy woods had not heard me sing;
Thy winds had not known my wing;
It had faltered ere thine did, Spring,
Had I wist.”

—Swinburne.





SKIN.

W. E. WATT.

One said he wondered that lether was not dearer than any other thing. Being demanded a reason: because, saith he, it is more stood upon than any other thiug in the world.—*Hazlitt*.

What! is the jay more precious than the lark,
Because his feathers are more beautiful?
Or is the adder better than the eel,
Because his painted skin contents the eye? —*Shakespeare*.

A GILDED live pig is a sight rarely seen. The rarity of putting gold leaf all over a living animal of any kind comes from the fact that the animal dies so soon after the operation. It has been tried several times and always with the same result.

The idea arose from an experiment unfortunately performed upon a child on the accession of Leo X. to the papal chair. The child was gilded all over to represent the Golden Age. The people of Florence were delighted with the idea, but the death of the child took place so quickly that some thought the brief duration of the Golden Age was miraculously represented as well as its great glory.

The experiment has never been repeated upon a human subject, but men of science cautiously tried to find out the secret of the child's living but a few hours after the operation, and so gilded pigs and varnished rabbits and other small animals. From such tests of the value of an open skin to animal life they found that all things that have breath must have open skin pores in order to maintain life.

Closing the pores of the skin causes the temperature to fall directly and the heart and lungs become gorged with blood. The circulation of the blood is seriously interfered with and death follows with the usual symptoms of asphyxiation.

Strange as it seemed to those who first witnessed such experiments, the life of an animal is more directly dependent upon the action of the skin than upon that of the stomach, the liver, or even the brain. Monstrosities have been born without brains; but they have frequently lived for some

time, taking their food regularly and having the appearance of as much comfort as others of their kind with brains. They died early, but their life was uniformly longer than the time which elapsed after the application of a coating which stopped the skin of other animals until death ensued.

A man will live much longer without stomach action than without the proper functions of the skin. In fact, the skin may take the place of the stomach in sustaining life for awhile, where the act of swallowing has been prevented by disease or accident. Feeding the patient through the skin has been accomplished with varying degrees of success. A bath of warm water or milk and water assuages thirst. Sailors deprived of fresh water wet their clothes with salt water, and the absorption of moisture sustains them where salt water taken into the stomach might have resulted fatally.

The health of the skin is closely connected with that of the whole system. Its appearance and condition as to moisture and dryness, as well as its temperature and color are regularly examined when the system is out of order. Since the skin is so important to the general health and its condition is placed so completely within our control, it is wise to care for it judiciously. We often find other organs of the body in an unsound condition and begin to doctor them when the whole trouble has arisen from bad treatment of the skin. The skin needs more care than the liver or the stomach, and many of the troubles laid at the door of one or both these organs may be avoided by proper care of the one organ over which we have entire control, the skin. Where the skin is pre-

vented from doing its proper work other organs try to carry it on, and the result is that those organs which are really beyond our control, and which will work properly without any attention from us, become diseased by our bad treatment of the organ that comes first in the natural order of attention.

The skin throws off waste matter from the system. Two and one-half pounds of watery vapor is poured out daily from the average man. A clogged skin retains certain salts in the system supposed to have something to do with such diseases as rheumatism and gout if left in the blood by two little exercise of perspiration.

Besides the sweat glands there are glands which exude fatty substances upon the skin, keeping it suitably lubricated and somewhat impervious to water. In some animals this secretion is so abundant that the skin cannot become wet in swimming. Beneath the skin are frequently cushions of fat to protect the soles of the feet and the outside of the larger joints. The blubber of the whale, the thickest skinned of all animals, is of this sort, and is evidently intended to make his tremendous weight less destructive when brought in contact with other objects. The hide of the swifter ones is peculiarly fitted with large papillæ of feeling which are supposed to warn them of the presence of rocks and other objects by the action of the water while swimming near them.

Insects, not having lungs, receive air into their bodies through holes in the skin. These are called spiracles. They are so protected by hairs within the holes that water will not enter them. This is why it is so difficult to drown an insect. But if you touch the abdomen of one of these skin-breathing creatures, for instance the yellow part of a wasp, with a drop of oil, the minute openings become almost immediately clogged and the insect falls dead as if choked completely.

The skin consists of two layers, both of which are exceedingly interesting. The outer or scarf skin is called the cuticle on the outside of the body, while wherever the skin dips into the body it is modified into what is called mucous membrane. This outer skin is

not what is rubbed off the surface in a Turkish bath manipulation or what is brought off by the rubbing one gives the body with a rough towel. These rubbings bring off merely the dead outer surface of the cuticle which should be out of the way because no longer useful. In man it continually wears off, in serpents it is shed annually in one slough.

The cuticle is the portion of the covering of the body which may best be noticed when a blister has been raised in the skin. The blister is an accumulation of fluid between the cuticle and the true skin.

The cuticle, or epidermis, is modified in many other ways than the one in which it becomes mucous membrane. Where the habits of the animal make warmth desirable the epidermis dips into the skin and without any break in its connection rises in the form of wool, which covers the body of the sheep so effectually. Where the animal is designed for flight there is the same characteristic dip into the material of the body, and out of the little sac so formed rises the feather which gives the bird its beauty and powers of flight. The feather is a modification of the scarf skin.

Where protection is needed for the body beneath the surface of the water this changeable substance covers the true skin with hard scales that make the friction of the water as slight as possible, while giving a firm and light resisting surface to prevent wounds. Horns and hoofs are modifications of the scarf skin. Where claws or talons are needed in the business of fighting or tearing food in bits or digging holes in the ground or elsewhere, the scarf skin changes itself at the extremities of paws and feet and produces nails, talons, and claws, whose powers are both marvelous and varied. For the protection of most mammals the whole of the body is favored by this power of the scarf skin to produce whatever seems necessary for the comfort of the individual, and the body is indented with innumerable minute holes called hair follicles into which the scarf skin dips and rises again to the surface transformed into hairs of varying de-

grees of fineness and color, beautifully arranged in order, and all pointing in such directions as will add to the beauty or comfort or terrifying aspect of the animal.

Not only are our hairs numbered, but each particular hair is furnished with a little individual muscle of its own running from the base of the follicle to the inner surface of the true skin, so that when the proper occasion arises for erection of that individual hair the muscle contracts apparently of its own accord, and up stands the hair along with its fellows, ready to frighten the animal that dares to approach in hostile attitude the owner of the precious coat. Similar muscles erect the feathers of the owl, and the gorgeous tail of the peacock dazzles us in the sunlight moved in like manner, while to those more powerful dermal appendages, the claws, talons, and nails, are attached more powerful muscles still, with proper nerve connections for the most effective use of the weapons nature has formed out of the soft outer skin, which is usually so mild and yielding as to have earned the name of scarf skin.

This outer skin is formed of cells, flat on the surface, but near the true skin where they originate, rounded and in many cases even tall and apparently reaching out towards the surface. It gives the color to the person by means of pigment cells which lie in its midst.

The black man is dark because of the abundance of pigment cells in his scarf skin. The albino is light because of their absence. The colors of hair and feathers are due to these cells in their receptacles, but white and iridescent feathers are doubtless so partly because of their absence and partly because of hollow spaces which catch and reflect or refract the light.

This arrangement of cells into scarf skin has much to do with the healing of wounds. In cases of old sores that refuse to heal, or where the skin has been extensively destroyed, the doctors have found that good, healthy skin may be grafted upon the sores in such a manner as to invigorate and perfect the process of healing. Small particles of fresh skin taken from a healthy sub-

ject or from some other part of the patient's body are placed upon the sore, the portions used being about the size of a small pinhead, and new life seems transplanted in the deadened part. The skin of a black man grafted upon that of a white man shows afterwards no trace of its origin, but becomes the same shade as that which it adjoins.

Several animals change their tints to correspond with their surroundings. This subject has been exaggerated by observers of an imaginative turn of mind, but the fact remains that there is a decided change in the coloring of certain crabs and shrimps as well as in soles, chameleons, tree-frogs, and two kinds of horned toads wherever they are found against any well-defined shade or color. Some have maintained that man takes on a tint somewhat resembling the soil of the territory where he abides in an uncivilized condition, but Beddard considers Schweinfurth's statement that the Bongos have a reddish-brown skin similar to the soil of their country, and the Dinhas, their neighbors, are as black as their alluvial ground, merely as an account of what is purely accidental in the instances given.

The coloring of most fish so that they cannot readily be seen by looking down into the water because of the blackness of their backs, is highly protective. And the fact is more apparent when we note that an enemy looking at the same fish from below is hindered in discovery because the white under parts of the fish are hard to distinguish against the light of the sky above. Nearly all the protective color markings of animals are modifications of the scarf skin.

The true skin is of great interest both because it is the seat of what is called the sense of touch and because it is used so extensively in the arts in the form of leather.

Nerves of sensation expand over the whole surface of the body, and their minute branchings in the skin make contact with other substances highly discernible. But the sense of touch is peculiarly developed in few of the lower animals, and we may almost regard it as an attribute of man alone. Our ability to turn our fingers about things and move our hands over their surface

gives us a power that is rare in nature. We can tell whether things are hot or cold, rough or smooth, sharp or blunt, wet or dry, and gather many other items of interest which the other senses are incapable of compassing.

A monkey can wind his tail about a nut and tell by the sense of touch whether it is worth his while to crack it. The elephant moves the tips of his trunk carefully over the surface of what he wishes to examine and gets knowledge he can depend upon. But it is the hand of man that shows the highest order of development of touch. By it blind men know their friends and read their books, bank clerks detect the qualities of the notes they handle, and a thousand deft acts in the arts are accomplished.

The true skin is covered with minute projections called papillæ. They may be traced in the palm by the ridges of the scarf skin. They are arranged there in rows so that while the naked eye does not discern the projections individually the rows of them may be noticed on the surface of the scarf skin. Some of these papillæ contain blood vessels and others corpuscles of touch. Some papillæ are small and simple, others compound. In one square inch of the palm have been counted 8,100 compound and 20,000 smaller papillæ arranged in regular rows. There seem to be different end organs for different sensations. There are different spots which may be touched with a fine pointed pencil of copper which is quite hot and no feeling will result. Perhaps the same identical spots touched by the same point, after having been immersed in ice water, will give sensations of cold. Hot spots and cold spots may be found and marked upon the skin. There are more hot spots than cold ones. Either of these when disturbed electrically will give sensations of heat or cold when neither heat nor cold is applied.

Ashe mentions an experiment which shows that the body is not equipped exactly alike on both sides, for when both hands are placed in hot water the heat seems greater to the left than to the right hand. Aristotle wrote of the peculiar feeling produced by placing the ends of the first and second fingers

upon a small substance like a pea. With the fingers in their natural position you feel one small round body. Place the same fingers upon the same pea, but with one finger crossed over the other so as to touch the pea on the other side, and you distinctly feel two peas. Another of the freaks of touch may easily be tried by placing the palms together so that fingers and thumbs are against their fellows. Close the hands partly and open them again repeatedly and in a short time instead of each finger's feeling another finger there will seem to be an oiled pane of glass between the hands keeping the fingers about a quarter of an inch apart. The delusion subsides when you look at your hands.

Leather was very early known in Egypt and Greece, and the thongs of manufactured hides were used by all nations for ropes, harness, and other instruments. The renowned Gordian knot, 330 B. C., was of leather thongs. A leather cannon was made in Edinburgh at the time of the American revolution. Although it was fired three times and found to answer, and other firearms were made of this material, it never became common. Had it not been for Mother Goose the leather gun might have dropped from the memory of man.

Leather is made from the true skin and tannic acid. The processes of tanning have recently undergone such changes and improvements that it is out of the question to follow them briefly. The union of the white fibres of gelatin, gluten, and kindred substances with the tannic acid, forms insoluble compounds which have great resistance and strength. This acid is found in oak and hemlock bark, and also in that of many other trees such as willow, ash, larch, sumac, and *terra japonica*. Tea is one-fourth tannic acid.

Deer skin makes the finer kinds of morocco, while sheep and goat skin make the grades that are used in book-binding. Seal skin makes a superior kind of enamelled leather for boots, bags, dressing-cases, and ornamental articles. Hog skin is so full of oil that it resists the tannic acid, yet saddles are made from it, and it has other uses. The French glove makers produce a



AZALEA.

very good kid glove from rat skin which can be distinguished from the real article only with a microscope.

The tanner applies the term, skin, to the smaller product taken from calves, dogs, rats, cats, and small game, reserving the dignified name of hide for that

of the full-grown ox or horse, while the skin from a two-year-old steer is called a kip.

The highest use of skins is in the form of parchment and vellum on which are printed and engrossed the most valuable documents prepared by man.

THE AZALEA.

Fill soft and deep, O winter snow !
The sweet azalea's oaken dells,
And hide the bank where roses blow,
And swing the azure bells !

—Whittier.

THE azalea is a genus of plants belonging to the natural order *Ericaceae* and to the sub-order *Rhodoreae* named in allusion to the dry places in which many of the species grow, and consists of upright shrubs with large, handsome, fragrant flowers, often cultivated in gardens. The genus comprises more than a hundred species, most of them natives of China or North America, having profuse clusters of white, orange, purple, or variegated flowers, some of which have long been the pride of the gardens of Europe. The general characteristics of the genus are a five-parted calyx, a five-lobed funnel-form, slightly irregular corolla, five stamens, a five-celled pod, alternate, oblong, entire, and ciliated leaves, furnished with a glandular point. Most of the species

differ from the rhododendrons in having thin, deciduous leaves. Some botanists unite the genus azalea to rhododendron. North America abounds in azaleas as well as in rhododendrons, and some of the species have long been cultivated, particularly *A. nudiflora* and *A. viscosa*, which have become the parents of many hybrids. Both species abound from Canada to the southern parts of the United States. *A. calendulcea*, a native of the South, is described as frequently clothing the mountains with a robe of living scarlet. All the American species are deciduous. In cultivation the azaleas love the shade and a soil of sandy peat or loam. Works on horticulture give specific and elaborate direction for the cultivation of the various species.

C. C. M.

COMMENDABLE BOOKS.

W. E. WATT.

Chapters on the Natural History of the United States. By Dr. R. W. Shufeldt. Studer Brothers, Publishers, 114 Fifth avenue, New York.

The man who is able to go out into the fields and see things is a good man to know. Whether he has the gift of telling well what he sees or not, we are glad to be with him, for he is full of the things we desire much to know, and we can get them out of him. If he is a rare story-teller, with marked

powers of description, so much the better. But if he combines these elements with the practice of an expert photographer and uses all his arts to get the secrets of nature down exactly as they appear, he is a prince of good fellows to all who worship at the shrine of nature.

Dr. Shufeldt has done all this, and his enterprising publishers have brought out the matter in a large octavo volume of about four hundred pages, solidly bound, with gilt tops. The price is only \$3.50, net, and

any lover of nature having the half tones he gives would not part with them for ten times the cost of the book.

Catching good negatives of live birds in the open is not easy. One needs to know photography and bird habits extremely well, and then be satisfied with a thousand failures along with a few successes. This knowledge and patience have been remarkably displayed by the author in the profusion of full-page reproductions of his valuable work.

The meadow lark's nest containing young birds is a most artistic plate. The tree toads clinging to their tree and the mother spider caught in the act of carrying her young in a silken ball are deserving of special commendation. His pair of cedar birds look particularly happy as they balance upon their twigs and eye the camera as if they knew all about it.

Horned toads and whales, dragon flies and opossums, as well as many other forms of life, both common and rare, have their turn at entertaining the reader, and their inmost thoughts seem to have been read by this enthusiastic and peculiarly successful scientist.

It is a good book for children of all ages, but wherever it is introduced into any family the younger children will uniformly have to wait till their elders have enjoyed it, for no age can be proof against its charms.

Birds of North America. Illustrated Descriptive Manual to Beard's Natural History Charts. Potter & Putnam Company, 63 Fifth Ave., New York.

This convenient little pamphlet contains brief descriptions of some of the most common birds, the eagle, the owl, the parrot, the crow, the turkey, the quail, the ostrich, the heron, the swan, and the penguin. It is closely printed with numerous illustrations of the structure and forms of the typical birds of each sort, and gives in language that can well be understood by children, the principal facts of interest.

It is sold at 20 cents, and will be found valuable to a large class of teachers who are in search of material to interest their pupils in the common birds of our country.

Nests and Eggs of North American Birds, by Oliver Davie, author of "Methods in the Art of Taxidermy," etc. The Landon Press, Columbus, Ohio.

This is the fifth edition of an excellent work that has already won wide recognition as an exposition of how the birds build and lay. It has been revised and enlarged con-

siderably, and now contains a profusion of cuts that will be highly appreciated. Recognizing the difficulty the mind has in grasping the entire meaning of a written description, the author has added to his text a large number of well-executed drawings of the birds most difficult to describe and has given their nests and eggs the attention their importance to the naturalist demands.

The book consists of over five hundred pages octavo, closely printed, and arranged so as to constitute a convenient and exhaustive encyclopedia of the birds of this country and their nests and eggs. Although the title of the book would lead one to think the matter does not pertain to the habits of the birds, nor their appearance, it is more complete in this respect than many books written ostensibly to describe the birds themselves, and in many of its articles almost complete life-histories are to be found. The nesting habits and the hatching of the eggs have led the author on till the work has become a very readable one for those who are by no means specialists on eggs and nests. The writer has modestly disclaimed attempting to cover so much ground and refers his readers to the works of Coues and Ridgway for further particulars.

The numbers of those who do not let a summer pass without looking into the lives of the birds which visit their country residences are rapidly growing, and this growth of interest on the part of thousands who do not wish to become experts but desire to enjoy their feathered neighbors and their products most fully, has made room for a large sale of this work. It has but to become known to be possessed by all cultured households where trips to the country are annually made.

To know the birds of one's locality by name and to be able to identify their nests and watch their doings with some degree of intelligence is an accomplishment which many desire and are annually attaining. With this work in one's possession few birds can remain in the vicinity without being identified. The gladness and loss of selfish thoughts and motives that are the reward of all those who lose their hearts to the birds and their growing families do far more good in the world than any amount of drugs and dieting.

Few people go to the country without having something they wish to gain in the way of health. A prescription of bird life taken regularly before meals has been found one of the greatest cure-alls the world has produced. There is no work in existence better calculated to promote this sort of convalescence than this one on the nests and eggs that we so often run past in our ignorance of the joy a bush or stump or tree has in store for those who have a mind to find it.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. V.

APRIL, 1899.

No. 4

THE NUTMEG.

(*Myristica fragrans* Hawthryn.)

DR. ALBERT SCHNEIDER.

Northwestern University School of Pharmacy.

Dum: A gilt nutmeg.

Biron: A lemon.

Long: Stuck with cloves.

—*Shakespeare*, "Love's Labor Lost," V., 2.

THE nutmeg is the spice obtained from a medium-sized evergreen tree reaching a height of from twenty-five to forty feet. This tree is dioecious, that is the male flowers and the female flowers are borne upon different plants. The male flower consists of a column of from six to ten stamens enclosed by a pale yellow tubular perianth. The female flowers occur singly, in twos or threes, in the axils of the leaves; they also have a pale yellow perianth. The ovary has a single seed which finally matures into the nutmeg and mace. The mature seed is about one and one-fourth inches long and somewhat less in transverse diameter, so that it is somewhat oval in outline. It is almost entirely enveloped by a fringed scarlet covering known as arillus or arillode (mace). The entire fruit, nut, mace, and all, is about the size of a walnut and like that nut has a thick outer covering, the pericarp, which is fibrous and attains a thickness of about half an inch. At maturity the pericarp splits in halves from the top to the base or point of attachment. The leaves of the nutmeg tree are simple, entire, and comparatively large.

The English word nutmeg and the apparently wholly different German

Muskatnuss, are etymologically similar. The "meg" of nutmeg is said to be derived from the old English "muge," which is from the Latin "muscus," meaning musk, in reference to the odor. "Muskat" of the German name is also derived from "muscus" and "nuss" means nut, so we have in both instances "musk nut." The arillus was named *Muscatenbluome* (nutmeg flower) by the early Dutch because of its bright red color.

It is generally believed that nutmeg and mace were not used in ancient times. Martius maintains that the word *macis* mentioned in a comedy by Plautus (260-180 B. C.) refers to mace. Flückiger, however, is inclined to believe that this word refers to the bark of some tree of India, as the word is frequently used in that sense by noted writers, as Scribonius, Largus, Dioscorides, Galenus, Plinius, and others. About 800 or 900 A. D., the Arabian physicians were familiar with nutmeg and were instrumental in introducing it into western countries. The Europeans first used nutmegs in church ceremonies as incense. Previous to 1200 nutmegs were quite expensive, but soon became cheaper as the plant was more and more extensively cultivated. About 1214 they found their way into pharmacy and began to be used among cosmetics.

Hildegard described nutmegs in 1150, and Albertus Magnus (1193-1280) described the tree and fruit. Not until about 1500 did European writers learn the home of the nutmeg. Ludovico Barthema designates the island Banda as its habitat.

The Portuguese monopolized the spice trade, including nutmegs, for a time, but as stated in a previous paper they were driven out by the Dutch, who regulated the nutmeg trade as they did the clove trade. That is, they destroyed all nutmeg trees not under the control of the government and burned all nutmegs which could not be sold. The government nutmeg plantations were in charge of army officials and worked by slaves. In 1769 the French succeeded in transplanting the nutmeg to the Isle de France. From 1796 to 1802 the spice islands were under the control of the English, who transplanted the nutmeg to Bencoolen, Penang, and, later, to Singapore. In 1860 the Singapore plantations were destroyed by a disease of the tree. The nutmeg is now cultivated in the Philippines, West Indies, South America, and other tropical islands and countries. The botanic gardens have been largely instrumental in extending nutmeg cultivation in the tropical English possessions. Besides *Myristica fragrans* there are several other species which are found useful. *M. Otoa* of the U. S. of Colombia yields an edible article known as Santa Fé nutmeg. The seeds of the tropical *M. sebifera* (tallow nutmeg) yield a fixed oil or fat used in making soap and candles. This oil is also known as American nutmeg oil.

The trees are produced from seeds. After sprouting the plants are transferred to pots, in which they are kept until ready for the nutmeg plantation. Transferring from the pots to the soil must be done carefully, as any considerable injury to the terminal rootlets kills the plants. A rich, loamy soil with considerable moisture is required for the favorable and rapid growth of the plants. They thrive best in river valleys, from sea-level to 300 and 400 feet or even to an elevation of 2,000 feet. The trees are usually planted twenty-five or thirty feet apart, in pro-

tected situations, so as to shelter them from strong winds and excessive sunlight.

The trees do not yield a crop until about the ninth year and continue productive for seventy or eighty years. Each tree yields on an average about ten pounds of nutmegs and about one pound of mace annually. If the trees are well cared for and the soil well fertilized, the yield is much greater, even tenfold.

As already stated the nutmeg plant is dioecious. A seed may therefore develop into a male or female plant; if a male plant it will of course not produce nutmegs. The only way to learn whether it is one or the other is to wait until the first flowers are formed during the fifth or sixth year. The planter does, however, not sit by and wait; he simply grafts the young shoots with branches of the female tree. Some male trees, about one to twenty female trees, are allowed to mature in order that pollination, by insects, may be possible, as without pollination and subsequent fertilization the seed could not develop.

The tree bears fruit all the year round, so that nutmegs may be collected at all times. It is, however, customary to collect two principal crops, one during October, November, and December, and another during April, May, and June. The nuts are picked by hand or gathered by means of long hooks and the thick pericarp removed. The red arillus is also carefully removed and flattened between blocks of wood so as to reduce the danger of breaking as much as possible. Mace and nuts are then dried separately. The nuts are placed upon hurdles for several weeks until the kernels, nutmegs, rattle inside of the thin, tasteless, and odorless hard shell. This shell is now carefully broken and removed; the worm-eaten nutmegs are thrown away and the sound ones are rolled in powdered lime and again dried for several weeks. Generally the drying is done over a smoldering fire so that the nuts are really smoke dried. For shipment they are packed in air-tight boxes which have been smoked and dusted with lime on the inside. Liming gives the nuts a





peculiar mottled appearance and tends to destroy parasites which may be present.

Mace loses its carmine color upon drying and becomes reddish-brown and very brittle. It has an odor and taste similar to those of the nut, but is more delicately aromatic. Wild or Bombay mace is obtained from *Myristica fatua* and is frequently used to adulterate the true mace or Banda mace. The nuts of *M. fatua* are longer than those of *M. fragrans* and are therefore designated as long nutmegs; the term "male nutmegs" applied to them is incorrect. The long nutmeg is greatly inferior to the true nutmeg, or round nutmeg as it is sometimes called.

Banda supplies by far the most nutmegs at the present time. Penang nutmegs are of excellent quality and are always placed upon the market unlimited, but they are frequently limed subsequently in foreign ports and markets. Singapore nutmegs are usually unlimited. Nutmegs are generally designated by the name of the country from which they are obtained, as Dutch or Batavian, Sumatra, Penang, Singapore, Java, and Banda nutmegs.

There are a number of so-called nutmegs which are derived from plants not even remotely related to *Myristica*. Ackawai, Camara, or Camaru nutmeg is the nut of a tree growing in Guiana highly valued as a cure for colic and dysentery. American, Jamaica, Mexican, or Calabash nutmeg is the spiciseed of *Monodora Myristica*. Brazilian nutmeg is the seed of *Cryptocarya moschata*, which serves as a very inferior substitute for nutmeg. Californian nutmeg is the fruit of a conifer (*Torreya*), which resembles nutmeg so closely in appearance that it has been supposed that *Myristica fragrans* was a native of California. This fruit has, however, a very camphoraceous odor. Clove or Madagascarian nutmeg is the fruit of *Ravensara aromatica*, a tree native in Madagascar. Peruvian nutmeg is the seed of *Laurelia sempervirens*.

The nutmeg has a peculiar mottled appearance, ranging from grayish brown to light gray or white in the limed article, the depressions and grooves holding the lime while the

ridges and elevations are free from it. In Shakespeare's Henry V. the Duke of Orleans, in speaking of the dauphin's dapple-gray horse, says: "He's of the color of nutmeg." The taste of nutmeg is peculiarly aromatic, pungent, and somewhat bitter.

The principal use of nutmeg is that of a spice, although not so commonly employed or so well liked as some other spices. It contains a fat which forms the nutmeg butter; this is an unctuous solid substance of an orange-brown or yellowish-brown color, with the odor and taste of nutmeg. This fat is used as a stimulating application in rheumatism, sprains, and paralysis. Nutmegs also contain some volatile oil, which is said to be poisonous; at least some persons are very susceptible to the effects of the volatile oil of nutmeg. In this connection it might be stated that the frequent and long-continued use of spices is injurious, producing dyspepsia, functional heart trouble, and nervousness, and seems to have a special action upon the liver, causing an excessive development of connective tissue and a reduction in the functional activity of the liver cells. "Nutmeg liver" is a condition resulting from passive venous congestion of that organ, and refers to its mottled or nutmeggy appearance only.

Mace is comparatively rich in volatile oil. Nutmeg and mace are both extensively employed as condiments. They are frequently given in the form of a powder to stimulate and aid digestion. Nutmeg flavor consists of nutmeg, oil of nutmeg, and alcohol. Mace-ale is ale sweetened and spiced with mace.

It is stated that whole nutmegs have been adulterated with wooden imitations. Connecticut is known as the Wooden Nutmeg State because it is facetiously said that such nutmegs were manufactured there.

Description of plate:

A, branch with staminate flowers; 1, stamens magnified; 2, longitudinal view of stamens; 3, transverse section of stamens; 4, pollen-grains; 5, pistillate flower; 6, pistil; 7, fruit; 8, half of pericarp removed; 9, nut with arillus (mace); 10, nut without mace; 11, nut in longitudinal section; 12, embryo.

AN ABANDONED HOME.

ELANORA KINSLEY MARBLE.

"WELL," said Jenny Sparrow one fine day in April, as she fluttered from bough to bough in a maple tree near my study-window, "spring is advancing and already the housewives are bustling about busy from morning till night. Such fetching and carrying of grass and straw and feathers! Mamma concluded to build a new house this spring but papa said the old homestead would do, with new furnishings. Papa always has his way; he's such a tyrant. I'm a fortunate creature that I have no such cares, I'm sure. Mamma says I may as well sing and fly high while youth and beauty last, for my troubles will begin soon enough. Troubles! The idea of my having trouble! Old people must croak, I suppose, and would really be disappointed if their children failed to experience the trials they have.

"I often wonder if papa strutted and bowed and swelled himself out as my suitors do, when he courted mamma. Now he does nothing but scold, and I never make an unusually fine toilet but he shakes his head, and lectures mamma on the sin of idleness and vanity. I'm not vain, I'm sure. I only feel strong and happy, and when I'm challenged by a neighbor's sons and their ugly sisters for a long flight or graceful curve, I would be a silly creature indeed if I didn't display my accomplishments to good advantage.

"There, now, is the son of our nearest neighbor twittering on that roof opposite and trying to attract my attention. He prides himself on being a direct descendant of one of the sparrows first imported into this country from England, so we call him Mr. Britisher. He has the most affected way of turning his head on one side and glancing at me. I can't help admiring his engaging manners, though, and there is a certain boldness in his address which the rest of my admirers lack, much to their disadvantage. He's going to fly over here presently, I know by the way he is strutting about and

fluttering his wings. Talk about the vanity of my sex! Gracious! He is priding himself now on the manner in which his toes turn out, and the beauty of his plumage, and how much broader is that black ring about his throat than those on some of his neighbors. Here he comes. I'll pretend to be looking another way.

"Ah, is that you, Mr. Britisher? How you startled me. Yes, 'tis a lovely day. After the storms of winter, the warm sunshine is a blessing to us little creatures who live under the eaves."

"True, Miss Jenny, true. But with companionship even the storms of winter can be borne cheerfully. Don't you agree with me that a loving home is a very desirable thing?"

"Oh, Mr. Britisher, how you talk! Have your parents been away from home, that you are so lonesome?"

"You know they have not, Miss Jenny. You know full well that I was not speaking of *that* kind of companionship. Permit me to sit beside you on that bough, for I have that to say, which I desire shall not be overheard. The leaves even seem to have ears at this season of the year, and do a deal of whispering about the numerous courtships which they hear and see going on."

"True, very true, Mr. Britisher," returned Miss Jenny, making room for him beside her on the limb. "There is a great amount of gossip going on just now in bird-land, I understand. Why, only the other day I heard—but ah—there is Mrs. Cowbird skulking below us, and no meaner bird flies, I think, than she. Fancy her laying her eggs in another bird's nest, because she is too lazy to make one of her own! A tramp bird must do a great deal of gossiping, so be careful what you say."

"She is not nearly such a mischief-maker as Mr. Blue Jay," replied Mr. Britisher, "nor half so impertinent. I heard him chattering with Mr. Blackbird the other day and he said all sparrows were alike to him. Fancy it! A field sparrow, vesper sparrow, swamp

sparrow, white-throated sparrow, yellow-winged sparrow, fox sparrow, and dear knows how many other common American sparrows, the same to him as a blue-blooded English one. Why, my ancestors lived under the roof of Windsor Castle, and flew over the head of Queen Victoria many, many a time."

"You don't say?" returned Miss Jenny, very much impressed. "Why, you are a member of the royal family, you may say. Our family, I have heard mother tell, always made their home in the city—London proper, you know, right under the eaves of the Bank of England. But come, that is not what you flew over here to say, surely," demurely casting her eyes upon the ground.

"How charmingly you coquette with me," said Mr. Britisher, moving closer to her on the limb. "Have you not seen for weeks past that I have had no thoughts for any girl-sparrow but you, Miss Jenny?"

"La, Mr. Britisher, I really have had so much attention from your sex this spring that I——"

"But none of them have been so devoted as I," interrupted her companion. "Think of the many delicious morsels I have laid at your feet, and all I ask in return is——"

"What?" cooly asked Miss Jenny, pretending she was about to fly away.

"This little hand," stooping and pecking her dainty claws with his bill. "Will you be my wife, Miss Jenny, the queen of my heart and home?"

"The queen of your heart and home," repeated Miss Jenny. "That sounds very nice, indeed. But when one gets married, my mamma says, then one's troubles begin."

"No, no, my dear one. Your husband will hold it his dearest privilege to guard you from every care. Life will be one long dream of bliss for us both. Say you will be mine."

"Well, I suppose I may as well say yes. Mamma says girls must be settled in life some time, and I am sure I fancy you infinitely more than any of the young sparrows hereabouts. So you can ask papa and—there, there! You will twist my bill off, and Mr. Woodpecker over there, I am sure is watch-

ing us. Really you put me in such a flutter with your fervor. There, you naughty boy; you mustn't any more. My! I am so nervous. I'll fly home now and quiet my nerves with a nap. I'm off. By-by."

The courtship was brief, as is the custom with our feathered friends, and so the wedding took place in a few days. The bride received the blessing of her parents for a dot and the groom a shrug of the shoulders and the comforting assurance from his father that he was a "ninny" and not aware when he was well off.

All went merry as a marriage bell for a season, Mr. Britisher twittering daily in soft low tones his prettiest love songs and his spouse listening in proud complacency as she oiled her feathers and curled them prettily with her bill.

"O," she said one day, when making a call upon a neighbor, "I'm quite the happiest creature in the world. *Such* a husband, and how he dotes on me! I had no idea I was such a piece of perfection, really. I wish all my friends were as well and happily mated. Those who have no such prospects are to be pitied indeed. Ah! you needn't bridle that way, Miss Brownie, for I had no particular individual in mind when I made that remark, believe me. Well, I must cut my visit short, for hubby will be looking for me, and he grows *so* impatient when I am out of his sight a moment. By-by. Run in and see us, do, all of you. We are stopping, you know, with papa and mamma for awhile."

"Did you ever see such a vain, silly thing?" said the mother of a large brood of very homely sparrows. "If my girls had no more sense than she, I'd strip every feather off 'em and keep 'em at home, I would!"

"She makes me sick," said a pert young thing in the group. "*Perfection* indeed! Why, when she laughs I'm always uneasy for fear her face will disappear down her throat. Such a mouth!"

"Hubby," mimicked another, "I thought I should collapse when she said that with her sickening simper."

"Well, well," smilingly said an old

mother sparrow, "she'll sing another song before long. I predict she'll be a shiftless sort of a thing when it comes to housekeeping. Mr. Britisher will repent him of his bargain ere many days, mark my words! Dearie," turning to her only daughter, "sing that dear little note you learned of Mr. Lark for the company. Thank heaven," stroking her darling's ugly feathers, "I have my precious child still with me. She is not in a hurry to leave her poor mamma, is she?"

Many sly winks and smiles were exchanged among the matron's friends at this remark, for "dearie" had chirped that little note many summers and winters, and many a snare had mother and daughter set to entrap the sons of more than one lady sparrow there.

"My dear," said Mr. Britisher the very next morning, "we must begin to build a nest and make a home like other people. I think we may as well begin to-day."

"Build our nest?" responded Mrs. B. "Well, do as you think best, my dear. I intend to make a few calls to-day, so you may as well employ your time whilst I am away. I presume some of your folks will help you."

"I suppose nothing of the sort," replied Mr. B., curtly. "Do you think you are to do nothing but make calls from morning till night? I chose you for a helpmate, madam, and not a figurehead, let me tell you, and the sooner you settle down to your duties the better it will be for us both."

"Duties?" retorted Mrs. B., "the idea! Who was it that promised me that if I would marry him I should not have a care in the world?"

"Oh, all lovers say such things," replied Mr. B., with a contemptuous laugh. "They expect their lady-loves to have better sense than to believe them."

"Better sense than to believe them!" repeated Mrs. B., angrily. "So you admit your sex are all gay deceivers, do you? Oh, dear," tears coursing down her pretty feathered cheeks, "that I should be brought to this! Woe is me, woe is me!"

Mr. Britisher immediately flew to her side, and by caresses and fond words endeavored to tranquillize his

spouse, for what husband can look upon the first tears of his bride and not upbraid himself for bringing a cloud over the heaven of her smiles?

Mrs. B. flew and hopped about with her wonted gaiety the remainder of the day, whilst Mr. B.'s preoccupation and downcast air was the cause of much comment and many wise "I told you so's," among the old lady-birds of the neighborhood.

The subject of nest-building was, of course, next day resumed; but Mrs. B. proved as indifferent and indisposed to participate in the labor as ever.

"Very well," said Mr. B., at last, resolutely disregarding her tears, "you will do as other wives do or else return to your mother. When a sparrow marries he expects his mate to do her share in making a home, and rearing a family. There is something to do in this world, madame, besides rollicking, singing, and visiting from post to pillar. Indeed, it is a wild scramble we have to make for a living, and you can no longer expect me to be furnishing you with tid-bits and insects out of season, while you gossip and idle your time away. You will have to-day to decide upon the matter," and off Mr. Britisher flew, with a heavy frown upon his face.

"Oh! I wish I had never been born," wailed Mrs. B., as the gentle wind stirred the leaves and swayed the branch upon which she was perched. "Already I begin to experience the troubles which old folks talk about. Oh, dear! Oh, dear! I'll fly over to mother and tell her how shamefully Mr. B. is treating me. I won't stand it, there! Gracious! there is that meddlesome Mr. Blue Jay sneaking around as usual. He has heard me sobbing, I'm afraid, and all the neighbors will be gossiping before night of our affairs. There! how cheerily I sang when I flew off! He will think my sobs were a new song, perhaps. To think that I should be making believe I'm happy already. Happy! I shall never be happy again. My heart is broken. Mother will give Mr. Britisher a piece of her mind, I hope, and let him know I was never brought up to work, much less to be any man's slave."

(To be concluded.)



Wm. A. S. W. 1871

THE AMERICAN BARN OWL.

(*Strix pratincola*).

LYNDS JONES.

OUR barn owl belongs to the tropical and warm temperate genus *Strix*, which is scattered widely over the greater part of the earth in the tropical and subtropical parts of both hemispheres, and scattering into the temperate zones. In Europe one species is common as far north as the British Isles, while our own bird is found as far north as southern New England in the East, Ontario, Michigan, Wisconsin, and southern Minnesota in the interior, and Oregon and Washington on the Pacific coast. It is hardly common anywhere except in the extreme southwestern part of the United States, where it is the most abundant owl in California. It is rare or casual north of about the fortieth parallel. But two specimens have been brought to the Oberlin College Museum in twenty years, one of which was found dead in a barn a mile east of Oberlin in December of 1898.

The barn owl is the most nocturnal of all our owls, although he can see perfectly in the brightest day. Not until twilight does he issue from his secure hiding-place to do battle with the farm and orchard pests. Then he may be seen sailing noiselessly over orchard and meadow in quest of any mischievous rodent that may be menacing the farmer's prospects. He seems to single out intelligently the ones that do the most injury, destroying large numbers of pouched gophers and other annoying and destructive creatures, asking only in return to be left in peace in his hiding-place. The farmer certainly has no better friend than this owl, for he destroys poultry only when driven to it by the direst necessity. In the East, his food consists largely of rats and mice; in some parts of the South the cotton rat is the chief diet; while in the West he feeds principally upon the gopher (*Thomomys talpoides bulbivorus*) and the California ground squirrel (*Spermophilus grammurus beecheyi*), according to Prof. B. W.

Evermann. It seems pretty certain that fish are sometimes captured and eaten.

This owl undoubtedly breeds, though sparingly, in all suitable localities wherever it is found, and probably migrates more or less in the northern part of its range. In Europe it nests in old ruins, towers, and abutments of bridges, but our American species finds few such places, so he resorts to hollow trees, caves, crevices in rocks, and banks, and even to burrows in the level ground, as we find to be the case in parts of the West. The burrows are undoubtedly the deserted burrows of some other animal. In the eastern parts of the country the owls frequently nest in buildings. It is well known that a pair occupied one of the towers of the Smithsonian building in the city of Washington in 1890, raising a brood of seven young. It is stated that the period of incubation is from three to three and a half weeks, and that brooding begins with the deposit of the first egg; thus there may be fresh eggs and young in the same nest. This accounts for the long period of incubation.

The eggs are pure white, usually from four to seven in number, rarely twelve. They are rather longer in proportion than those of the other owls—in about the proportion of 1.30x1.70. But the average size is variously given by the various authors.

It seems a little curious that there should be such a marked difference between the hawks and owls as regards nest material. They belong to the same order of birds, and yet the hawks build their own nests, collecting the material and arranging it much after the fashion of higher birds, while the owls make practically no nest, at the most collecting a little material and scattering it about with little regard for arrangement. But the difficulty disappears when we realize that the owls have probably always nested in hollows which require no nest material, while

the hawks, if they ever nested in hollows, have long ceased to do so, building their nests among the branches of trees, where a relatively large amount of material is necessary. The few species of hawks which now nest in hollows have gone back to that method after a long period of open nesting and have retained the nest material even here where it seems unnecessary.

The monkey-like appearance of this owl, emphasized by his tawny color and screeching voice, gives him a decidedly uncanny appearance. His plumage is unusually soft and fluffy, but is too thin to enable him to withstand the rigors of a northern winter. Curiously enough, the feathers on the back of his tarsus grow up instead of down, giving that part of his plumage a rather ungroomed appearance. One

edge of his middle toe-nail is toothed like a comb.

During the nesting season only a single pair can be found in a place, but at other times the species is more or less gregarious in the regions in which it is numerous. Often a dozen individuals may be found in a company. The extreme seclusiveness of the birds during the day makes it very difficult to find them, and they are undoubtedly more numerous than generally reported, and are likely to be present in many places where their presence is not now suspected. They seek the darkest and most secluded corner possible and remain quiet all day. Their noiseless flight might easily be mistaken for that of the whippoorwill. Let us hope that the good qualities of this owl will be fully recognized before his hiding-place is discovered.

A SPRINGTIME.

One knows the spring is coming;
There are birds; the fields are green;
There is balm in the sunlight and moon-
light,
A dew in the twilights between.

But ever there is a silence,
A rapture great and dumb,
That day when the doubt is ended,
And at last the spring is come.

Behold the wonder, O silence!
Strange as if wrought in a night,—
The waited and lingering glory,
The world-old fresh delight!

O blossoms that hang like winter,
Drifted upon the trees,
O birds that sing in the blossoms,
O blossom-haunting bees,—

O green leaves on the branches,
O shadowy dark below,
O cool of the aisles of orchards,
Woods that the wild flowers know,—

O air of gold and perfume,
Wind, breathing sweet, and sun,
O sky of perfect azure—
Day, Heaven and Earth in one!

Let me draw near thy secret,
And in thy deep heart see
How fared, in doubt and dreaming,
The spring that is come in me.

For my soul is held in silence,
A rapture, great and dumb,—
For the mystery that lingered,
The glory that is come!

—*W. D. Howells.*

THE KANGAROO.

C. C. M.

THE Kangaroos are regarded as among the most remarkable of mammals. Everything about them is extraordinary; their movements and their attitudes when at rest, the way they seek their food, their reproduction, their development, and their mental qualities. Twenty and thirty years ago, it is said, the visitor to Australia could see more Kangaroos to the square mile than there are jack rabbits to-day, and it was literally impossible to avoid the countless flocks that swarmed over the whole island. Walsh says that, with a good rifle, he could take a position on a rock and shoot all day long, until tired of the monotony of the slaughter, or until some "old man" kangaroo became desperate at his killing and decided to turn the table upon him. In those days men were paid liberally by the sheepowners to kill off the kangaroos, and it is stated that one hunter would kill several hundred a day, and one man is known to have cleared \$4,500, free of living expenses, in a single year. The visitor to Australia to-day discovers a decided change in many ways, but not more so than in the comparative scarcity of this animal. He may reside on the island for a month or two and not see one kangaroo. There are still large numbers of them, but they must be hunted up and their favorite feeding-places located by guides. The sheepherders caused the creatures to be destroyed in such numbers before they became of any commercial value that they are now rarely found outside of the "bush." About three hundred miles back from the coast thousands can still be found. The country abounds in straggling bushes, with very few tall trees or woods to obstruct travel; but the bushes, while in the open country, are tall enough to make good hiding-places for the marsupials. They feed on the grass, roots, and leaves, and when startled by a hunter, leap over the bushes as easily as a rabbit jumps over the tufts of grass.

The hind legs of the kangaroo are

powerful weapons. One long claw, hard as bone or steel, and sharp as a knife at the point, gives the kangaroo an implement, says a writer in the *Scientific American*, that can kill a man or beast with one blow. The front paws are not so strong, but an old fellow has strength enough in them to seize a dog and hold him under the water until dead. On land they will seize an enemy and hold him until the hind claws can cut him nearly in two. They are also good boxers, and when the natives attempt to kill them with clubs they dodge the implements with all the skill of a professional pugilist, and unless the man is an expert he may get the worst of the encounter. Quite a number of hunters have been severely injured, and some killed, by attempting to corner a wounded kangaroo when enraged by a bullet wound. The fleetest horse cannot keep pace with any of the larger kangaroos, but with a little tact the hunters are enabled to capture them whenever they are sighted. When the creatures are once started on a run, they will not swerve from their course, but continue straight onward, leaping over bushes, rocks, and all ordinary obstacles. The hunters generally station themselves in the line that the animals are most likely to pursue, and then wait until the dogs or the rest of the party start them up.

The ordinary gait of the kangaroo, which it assumes principally when grazing, is a heavy, awkward hobble. It supports its fore feet on the ground and then pushes the hinder legs on between them. While doing so it must also support itself on its tail, as else it could not lift its long hinder legs high enough to render such movements possible. But it remains in this position no longer than is absolutely necessary. Whenever it has plucked some favorite plant, it assumes the erect position to consume it. In their sleep the smaller species adopt a position similar to that of a hare in its form. Closely crouched to the ground, they squat down on all fours, the tail being

extended at length behind the body. This position enables them to take flight instantly.

The kangaroo leaps only on its hinder legs, but its bounds surpass those of any other animal in length. It presses its fore limbs tightly against the chest, stretches the tail straight out backwards, thrusts the long and slender hind legs against the ground with all the force of the powerful thigh muscles, and darts like an arrow through the air in a low curve. The leaps follow in immediate succession, and each is at least nine feet, but the larger species cover, not infrequently, from twenty to thirty-three feet at a bound, the height of each leap being from six to ten feet. Few hounds can keep pace with a kangaroo.

The kangaroo rarely gives birth to more than one young at a time. When the young one is born the mother takes it up with her mouth, opens the pouch with both fore feet, and attaches the little creature to the breast. Twelve hours after birth it has a length of only a little over one and one-fifth inches. Its eyes are closed, its ears and nostrils are only indicated, the limbs yet unformed. There is not the slightest resemblance between it and the mother. For nearly eight months it is nourished exclusively in the pouch. A considerable time after it first peeps out of the pouch the young one occasionally leaves its refuge and roams about near its mother, but for a long time it flees back to the pouch whenever it apprehends any danger. It approaches its mother with long bounds and dives

headlong into the half-open pouch of the quietly sitting female.

Numerous methods are employed to exterminate the animals; they are shot with fire-arms or coursed to death by hounds, and that for very wantonness, for the slain bodies are left to rot in the woods. "That is the reason," says an anonymous writer, "why the kangaroos are already exterminated in the environs of all larger cities and settlements; and if this savage chase is permitted to continue, it will not be long ere they will be numbered among the rarer animals in the interior also."

The kangaroo readily resigns itself to confinement, and is easily maintained on hay, green fodder, turnips, grain, bread, and similar articles of food. It does not require a specially warm shelter in winter and breeds readily if given proper care. At present it is more rarely seen in confinement in Europe and America than when it was more numerous and easier to capture in its native country. With good treatment it survives a long time; specimens have lived in Europe from ten to twenty-five years.

The kangaroos are very dull in intellect, even sheep being far superior to them in this respect. Anything out of the accustomed order confuses them, for they are not capable of a rapid comprehension of new surroundings. Every impression they receive becomes clear to them only gradually. Brehm says a captive kangaroo becomes used to man in general, but expresses doubt whether it discriminates between its keeper and other people.

INVITATION TO THE REDBREAST.

Sweet bird, whom the winter constrains—

And seldom another it can—

To seek a retreat—while he reigns

In the well-shelter'd dwellings of man,

Who never can seem to intrude,

Though in all places equally free,

Come, oft as the season is rude,

Thou art sure to be welcome to me.

At sight of the first feeble ray,

That pierces the clouds of the east,

To inveigle thee every day

My windows shall show thee a feast.

For, taught by experience, I know

Thee mindful of benefit long;

And that, thankful for all I bestow,

Thou wilt pay me with many a song.

Then, soon as the swell of the buds

Bespeaks the renewal of spring,

Fly hence, if thou wilt, to the woods,

Or where it shall please thee to sing:

And shouldst thou, compell'd by a frost,

Come again to my window or door,

Doubt not an affectionate host,

Only pay, as thou pay'dst me before.

Thus music must needs be confest

To flow from a fountain above;

Else how should it work in the breast

Unchangeable friendship and love?

And who on the globe can be found,

Save your generation and ours,

That can be delighted by sound,

Or boasts any musical powers?—*Cowper.*



FROM COL. CHAS. ACAD. SCIENCES.

KANGAROO.
1 1/2 to 2 1/2

COPYRIGHT 1899,
NATURE STUDY PUB. CO., CHICAGO.



FEATHERS.

W. E. WATT.

A splendid young blackbird built in a tree;
A spruce little fellow as ever could be;
His bill was so yellow, his feathers so black,
So long was his tail, and so glossy his back,
That good Mrs. B., who sat hatching her eggs,
And only just left them to stretch her poor legs,
And pick for a minute the worm she preferred,
Thought there never was seen such a beautiful bird.

—D. M. Mulock.

Oh! Nature's noblest gift—my gray-goose quill!
Slave of my thoughts, obedient to my will,
Torn from thy parent bird to form a pen,
The mighty instrument of little men!

—Byron.

FEATHERS have played an important part in the history of mankind. Henry of Navarre won the battle of Ivry after electrifying his men with the following words: "Fellow soldiers, you are Frenchmen; behold the enemy! If you lose sight of your ensigns, rally round my plume; you will always find it on the high road to honor!"

No doubt the templars carried the hearts of many with them in the crusades more effectually because their waving plumes gave them a picturesqueness which inspired brave men with courage and pious ones with holy zeal.

Savages delight in adorning themselves with feathers, and civilized women have found their charms enhanced by the placing of feathers against fair skins until the close of the nineteenth century finds a social struggle raging through fear that the demands of fashion may yet destroy from the face of the earth its sweetest songsters and its most beautifully plumed creatures.

Fans of feathers are admired the world over. In warm countries huge fans or screens made of beautiful feathers are often carried to shade royalty. In great processions the Pope is followed by bearers of magnificent fans of ostrich plumes. In the Sandwich Islands for a long time the enthroning of a new king was made gorgeous by his wearing a garment of many thousands of feathers; but recently, as if in preparation for a union with the United States, this state gar-

ment was buried with the king and the ceremony became simpler.

The noblest use to which feathers have been adapted has been in the production of writing instruments. The antiquity of the pen, regarded as a feather, is shown in the proof recently set forth by the philologists. *Penna* is the Latin for feather; farther back an instrument for flying is called *patna*; the Sanskrit which became *penna* in the Latin tongue became *phathra* in the mouths of the Teutonic peoples. So the English language, which is formed from both Latin and Teutonic elements, possesses two words, *pen*, and *feather*, which were one in their origin, have been widely separated during the ages, and now are united, but in such a way that only under the microscope of comparative grammar are we able to discover that they have the same blood in their veins.

Although the people living in warm countries wrote with the reed, the Chinese with a brush, and we have learned to fashion steel so it will do the work to better advantage, yet the feather has been a mighty agency in the civilization of the world.

Every teacher used to consider it one of the essentials of his equipment to possess a good penknife and know how to use it in making or mending pens for his pupils. Quills were first carefully cleansed from all oily or fatty matter and then dried. A gentle heat was applied to secure the brittleness which made it possible to split the pen point without spoiling the quill.

In Russia and in Holland quills were dipped in boiling alum-water or diluted nitric acid and then dried and clarified in a bath of hot sand. Goose quills were most used, turkey quills were prized by many, and swan quills were considered the best of all. Pens well made from swan quills often sold as high as four guineas a thousand, while goose quill pens were to be had at twenty shillings. For fine writing, crow-quills were considered best, and pen-and-ink drawings were generally produced with the black-plumed article.

In 1832, to supplement the domestic products in the manufacture of pens, 33,668,000 quills were imported into England. The trade has not been entirely killed by the advent of the steel pen, for there are yet among us representatives of the people of the olden time who delight in the pretty little squeak of the quill pen as it assists them in their literary labors.

Man early learned to rob the birds of their coverings, not only for adornment, but also for warmth. Feather beds were once reckoned as evidences of wealth. Modern science has pointed out the unhealthful condition of a bed made soft and gaseous with feathers. Few beds are now found of this sort among the better-informed people of America, but the traveler in the northern countries of Europe not only has to sleep on feathers but also under them. The down coverlet is as essential to a Danish bed as is clean linen.

The newest palace of the German emperor is furnished in accordance with the Teutonic idea, and the visitor to the palace at Strasburg, when his majesty is not there, is shown his royal bed room with its single bed and double featherings.

Downy feathers grow most abundantly on birds inhabiting cold regions. Many young birds have an abundance of downy feathers when first hatched. In some cases it is well formed before the egg is broken, firmly enclosed in a tight roll of membrane to keep it dry. On exposure to the air the membrane bursts and the down wraps the nestling in a comfortable coat.

The stronger feather sometimes grows out of the same place as the downy one in such a way that it pushes out the down to the outside of the plumage and the bird appears to have his underwear outside his overcoat.

The best eider-down is so light that three-quarters of an ounce of it will fill a large hat. It is so elastic that two or three pounds may be compressed into a ball that may be held in the hand.

Some feathers have a second shaft growing out of the end of the quill so as to form a double feather, and in rare instances there are two of these growths from one quill, making a triple feather.

Birds are warmer blooded than other animals. What is a dangerous fever temperature in the blood of man, is natural and ordinary in a bird. As birds fly rapidly, they could not live if they were perspiring creatures because they would lose heat so fast. Feathers protect them from the sudden changes of temperature and loss of heat and strength.

Feathers are important to the bird to fly with; but even for this purpose they are not absolutely necessary. There are forms of animals that fly, as the bat does, with their skin to beat the air. There were once on the earth many more skin-flying animals than there are to-day.

Feathers are modifications of the scarf-skin. Wherever the skin is exposed to sun, wind, or water it is modified in some way to contribute to the well-being of the animal. The many forms of feathers make a most fascinating study.

A peculiar thing about them is that they are not vascular. Vascular means full of vessels. Almost everything that grows is vascular. It has tubes to carry in new material and little sacs or large ones to store substance for new growths. But dermal appendages, the forms that grow out of the scarf-skin and are modifications of it, are not vascular. Take a feather two feet long, and examine it to see how the feather material was carried from the beginning of the quill to the tip. You find no veins and no circulation. Yet feathers grow and their growth is quite

mysterious and not understood by the wisest people.

The material of a feather consists of cells that push each other out to their destination. They change their forms as they travel along, and their colors and degrees of hardness change with their going. They are composed of about the same stuff that makes horns and hoofs. Your finger nail is like a feather in its growth and composition. It is mostly albumen with some lime in it. Albumen is the substance which makes the white of eggs.

When the Mexican motmot trims his two tail feathers with his beak, he merely makes diamond cut diamond. The material of the cutting instrument is the same as that of the thing cut, only somewhat harder.

When you consider how a feather grows by pushing out its cells you must wonder at the intelligence which guides the cells to change their nature so as to form the quill, the shaft, the after-shaft, the barb, the barbules, and the little hooks which hold them together. More than this is the cause for admira-

tion seen in the regular change of pigment contained in the cells, so the feather shall have its beautiful colors and accurate markings.

Along with the materials of the feather is carried a little oil which turns the water from the duck's back and gives the feather its gloss. It is thought by some that the fading of feathers in museums where mounted specimens are exposed to the action of light is largely due to the loss of this delicate oil. No enterprising Yankee has come forward yet with a patent for restoring this oil and giving back to the thousands of musty and dusty skins in our museums their original brilliancy.

Every one wonders at the way feathers keep their shape instead of getting hopelessly ruffled. The little hooks which hold the barbules together are exceedingly strong and flexible. They will yield and bend, but never break. Even when torn apart from their hold they can grasp again so as to restore the injured feather to its former shape.

VISION AND SCENT OF VULTURES.

REV. R. T. NICHOL.

To the Editor of Birds and All Nature:

SIR: Are you not mistaken in the assertion in your October number that vultures, carrion-crows, etc., have such keen scent that they can detect carcasses and offal at a very great distance?

I was under the impression that Wilson* had decided this forever, and proved conclusively that their apparently miraculous power of discovering their proper food, was due to keenness of vision, and not of the sense of smell.

The following extracts may be new to some and interesting to all of your

readers: Under the head "*Vultur aura*, Turkey Vulture," etc., I find:

"Observations on the supposed power which vultures such as the turkey vulture, are said to possess of scenting carrion at a great distance.

"It has always appeared to us unaccountable that birds of prey, as vultures, could scent carcasses at such immense distances, as they are said to do. We were led to call in question the accuracy of this opinion, on recollecting the observations of some travelers, who have remarked birds of prey directing their course towards dead animals floating in the rivers in India, where the wind blows steadily from one point of the compass for months in succession. It was not easy to conceive that the effluvium from a putrid carcass in the water, could proceed in direct opposition to the current of air,

*When I said "Wilson" above I find I was slightly mistaken. I remembered reading it long ago in the first edition I possessed of this writer's works—the little four-volume set edited by Prof. Jameson for "Constable's Miscellany," Edinburgh, 1831, and taking down the book now, which I have not opened for years, I find the passages in question (Vol. iv, pp. 245 *et seq.*) form part of an appendix drawn from Richardson and Swainson's "Northern Zoology," and that the real authority is Audubon.

and affect the olfactory nerves of birds at so many miles distant. We were disposed to believe that these birds were directed towards the carrion rather by the sense of seeing than by that of smelling. This opinion is confirmed by the following observations of our friend Audubon, communicated to us by him some time ago for our *Philosophical Journal*."

Here follows at length Audubon's communication, from which I extract the following passages:

"My *First Experiment* was as follows: I procured a skin of our common deer, entire to the hoofs, and stuffed it carefully with dried grass until filled rather above the natural size,—suffered the whole to become perfectly dry and as hard as leather—took it to the middle of a large open field, and laid it down upon its back with the legs up and apart, as if the animal were dead and putrid. I then retired about a few hundred yards, and in the lapse of some minutes a vulture coursing around the field, tolerably high, espied the skin, sailed directly towards it, and alighted within a few yards of it. I ran immediately, covered by a large tree, until within about forty yards, and from that place could spy the bird with ease. He approached the skin, looked at it without apparent suspicion, raised his tail and voided itself freely (as you well know all birds of prey in a wild state generally do before feeding), then approaching the eyes, that were here solid globes of hard, dried, and painted clay, attacked first one and then the other, with, however, no farther advantage than that of disarranging them. This part was abandoned; the bird walked to the other extremity of the pretended animal, and there, with much exertion, tore the stitches apart, until much fodder and hay were pulled out; but no flesh could the bird find or smell; he was intent on finding some where none existed, and, after reiterated efforts, all useless, he took flight, coursed round the field, when, suddenly turning and falling, I saw him kill a small garter snake and swallow it in an instant. The vulture rose again, sailed about, and passed several

times quite low over the stuffed deer-skin, as if loth to abandon so good-looking a prey.

"Judge of my feelings when I plainly saw that the vulture, which could not discover through its extraordinary sense of smell that no flesh, either fresh or putrid, existed about that skin, could at a glance see a snake scarcely as large as a man's finger, alive, and destitute of odor, hundreds of yards distant. I concluded that, at all events, his ocular powers were much better than his sense of smell.

"*Second Experiment*.—I had a large dead hog hauled some distance from the house and put into a ravine, about twenty feet deeper than the surface of the earth around it, narrow and winding much, filled with briars and high cane. In this I made the negroes conceal the hog, by binding cane over it, until I thought it would puzzle either buzzards, carrion-crows, or any other birds to see it, and left it for two days. This was early in the month of July, when, in this latitude, a body becomes putrid and extremely fetid in a short time. I saw from time to time many vultures, in search of food, sail over the field and ravine in all directions, but none discovered the carcass, although during this time several dogs had visited it and fed plentifully on it. I tried to go near it, but the smell was so insufferable when within thirty yards of it that I abandoned it, and the remnants were entirely destroyed at last through natural decay.

"I then took a young pig, put a knife through its neck, and made it bleed on the earth and grass about the same, and, having covered it closely with leaves, also watched the result. The vultures saw the fresh blood, alighted about it, followed it down into the ravine, discovered by the blood of the pig, and devoured it, when yet quite fresh, within my sight."

He pursues the subject at some length, recounting other experiments; but these, were they not even given on the authority of Audubon—*clarum et venerabile nomen*—seem to me to be conclusive.

22 Irving place, New York



THE HOARY BAT.

C. C. M.

A VERY singular animal is the bat, and seems to belong to several classes and orders. The specimen we present here (*Atalapha cinerea*) is very rare in this part of the country, and was taken in Lincoln Park, Chicago. It flies through the air like a bird and, possessing mammæ like the quadrupeds, suckles its young. The double jaw is provided with three kinds of teeth. With the canines and incisors it tears its prey like carnivorous animals, and with the molars or grinders it cracks nuts like rodents, which it resembles in the narrow, oval form of its head. An imperfect quadruped when on the ground, it drags itself along, embarrassed by the mantle of its wings, which fold up around its legs like an umbrella when closed. When it undertakes to fly it does so in an awkward manner. It first crawls painfully along, and with great difficulty extends its long fingers, spreading out the membrane which covers and binds them together. The ungainly creature then quickly flaps its broad wings, tough as leather, but thin and transparent; a bird without plumage, it now flies abroad in pursuit of insects—nocturnal like itself—or in search of ripe fruit, to which some species are particularly destructive.

None of the bats like to raise themselves into the air from a perfectly level surface, and, therefore, use all their endeavors to climb to some elevated spot, from whence they may launch themselves into the air. They climb with great ease and rapidity, being able to hitch their sharp and curved claws into the least roughness that may present itself, and can thus ascend a perpendicular wall with perfect ease and security. In so doing they crawl backward, raising their bodies against the tree or wall which they desire to scale, and drawing themselves up by the alternate use of the hinder feet. When they have attained a moderate height, they are able to fling themselves easily into the air and to take immediate flight. They have the power of rising at once from the ground, but always

prefer to let themselves fall from some elevated spot. One reason why bats take their repose suspended by their hind feet is said to be that they are then in the most favorable position for taking to the air. There may be, and probably are, other reasons for the curious reversed attitude. Even among the birds examples are found of a similar mode of repose. Members of the genus *Colius*, an African group of birds, sleep suspended like the bats, clinging with their feet and hanging with their heads downward. But these birds cannot assume this attitude for the purpose of taking flight, as their wings are used as readily as those of most other feathered creatures, and, therefore, there must be other reasons to account for the strange attitude.

The more closely we approach the torrid zone, it is said, the greater is the number of bats and the richer their variety. The South is the native country of the majority of wing-handed animals. Even in Italy, Greece, and Spain, the number of bats is surprising. There, according to Brehm, who studied them industriously, as evening draws nigh they come out of their nooks and corners not by hundreds but by thousands. Out of every house, every old stone wall, every rocky hollow they flutter, as if a great army were preparing for a parade, and the entire horizon is literally filled with them. The swarms of bats one sees in a hot country are astonishing. They darken the sky. Everywhere there is a living and moving mass flying through the trees or gardens and groves. Through the streets of the town, through houses and rooms flits the moving train. Hundreds are constantly appearing and disappearing and one is always surrounded by a hovering swarm.

A feature of the wings of bats, is a highly elastic skin. The outer layer is constantly kept pliable by anointing with an oily liquid, secreted by glands in the animal's face. The structure of the hair is also remarkable, as each thread presents under the microscope a screw-like appearance.

THE COMING OF SPRING.

E. E. BENTON.

NO ONE perhaps ever lived who excelled Henry D. Thoreau as a general observer of nature.

He patiently and with minute care examined both animate and inanimate creation, and wrote down an accurate account of his observations, noting particularly the effects produced by the changes in the seasons. He worked diligently to discover the first sign of spring, with results not wholly satisfactory. In one place he asks: "What is the earliest sign of spring? The motions of worms and insects? The flow of sap in trees and the swelling of buds? Do not the insects awake with the flow of the sap? Bluebirds, etc., probably do not come till the insects come out. Or are there earlier signs in the water, the tortoises, frogs, etc.?"

He found that whenever there was a warm spell during the winter some forms of vegetation, particularly the grasses and water plants, would begin to grow, and some would even bloom in favorable locations, as the skunk cabbage. He did not fully settle the question as to what would begin to grow first in the spring, whether it was the catkins of the swamp willow or the stems and leaves of the equisetum in the pool, or something else.

A list of the most striking phenomena observed by Thoreau in early spring is given below, and is extracted from his journals, written when he lived near Boston, during the years 1840 to 1860. In each case the earliest date mentioned by Thoreau is given, there being a difference of about a month between the earliest and latest spring. Many of these phenomena and the order in which they occur are common to a large extent of country, including the eastern and northern central states. Thus, the skunk cabbage is the first flower in all this region. A few notes are added, showing variations.

February 21—Sap of the red maple flowing. This was in 1857. It does

not usually flow until the second week in March.

February 23—Yellow-spotted tortoise seen.

February 24—The bluebird, "angel of the spring," arrives; also the song-sparrow. The *phebe* or spring note of the chickadee, a winter bird, heard.

"The bluebird and song-sparrow sing immediately on their arrival, and hence deserve to enjoy some preëminence. They give expression to the joy which the season inspires, but the robin and blackbird only peep and *tchuck* at first, commonly, and the lark is silent and flitting. The bluebird at once fills the air with his sweet warbling, and the song-sparrow, from the top of a rail, pours forth his most joyous strain."

March 1—The catkins of the willow and aspen appear to have started to grow.

March 2—The caltha, or cowslip, found growing in water.

The skunk cabbage in bloom in warm, moist grounds.

March 5—The red maple and elm buds expanded.

The spring note of the nut-hatch heard: *To-what, what, what, what, what*, rapidly repeated, instead of the usual *quah quah* of this winter bird.

March 6—The gyrenid (water-bug) seen in the brook.

First blackbird seen.

Green sprouts of the sassafras, hazel, blueberry, and swamp-pink found.

March 7—Fuzzy gnats in the air.

First robins.

Spring note of the shrike heard, probably silent during the winter.

March 8—Willow buds expanded. Sap flowing in the white pine.

Flock of grackles seen.

Radical leaves of the golden-rods and asters in water, growing decidedly.

March 9—Ducks seen.

March 10—Poplar and willow catkins started; also equisetum (horsetail), saxifrage, and probably other water plants. The butter-cup found growing.

Shimmering in the air noticed, caused by evaporation; water in the brooks, "clear, placid, and silvery," both phenomena of spring.

March 12—Poplar catkins in bloom.

First meadow-lark seen.

March 14—Wild geese seen.

Fox-colored sparrows seen.

March 15—Grass growing in water. Wood, or croaking frog heard; "the earliest voice of the liquid pools."

March 16—The first phebe bird heard. Gulls and sheldrakes seen.

March 17—Grass green on south bank-sides.

The first flicker and red-wing seen; also a striped squirrel; also some kind of fly.

March 18—The skunk cabbage, in moist grounds, abundantly in bloom, attracting the first honey-bees, who, directed by a wonderful instinct, leave their homes and wing their way, perhaps for miles, to find this first flower. This seems all the more remarkable when it is considered that the honey-bee is an introduced, not a native insect.

March 19—The first shiners seen in the brook.

March 20—Pussy-willow catkins in full bloom.

"The tree-sparrow is perhaps the sweetest and most melodious warbler at present."

"The fishes are going up the brooks as they open."

March 21—The garden chickweed in bloom.

The ground-squirrel's first chirrup heard, a sure sign, according to some old worthies, of decided spring weather.

The hyla, or tree-frog, begins to peep.

"The woods are comparatively silent. Not yet the woodland birds, except (perhaps the woodpecker, so far as it migrates) only the orchard and river birds have arrived."

March 23—The white maple in bloom and the aspen nearly so; the alders are generally in full bloom. "The crimson-starred flowers of the hazel begin to peep out."

March 24—Shore-larks seen.

March 28—Buff-edged butterflies seen.

March 31—The small red butterfly seen.

April 5—Swallows appear, pewee heard, and snipe seen.

April 6—Cowslips nearly in bloom.

April 7—Gold-finches seen; also the purple finch.

April 8—Pine warbler seen.

The epigæa (trailing arbutus) nearly in bloom. "The earliest peculiarly *woodland, herbaceous flowers are epigæa, anemone, thalictrum (or meadow rue), and, by the first of May, the violet."

*NOTE.—Further to the west and extending at least to Wisconsin, the following list of early woodland flowers may take the place of the above, blooming in the order given: Eriogonum (or harbinger of spring), hepatica, bloodroot, and dog-tooth violet, or perhaps the dicentra (Dutchman's breeches) may come before the last.

The skunk cabbage, which is not a woodland flower, and therefore not included in the above list, is the first flower probably in all New England and the northern states.

April 9—†Cowslips (not a woodland flower) in bloom, "the first conspicuous herbaceous flower, for that of the skunk cabbage is concealed in its spathe."

†NOTE.—In the West several conspicuous flowers, particularly the pretty hepatica, precede the cowslip.

THE NASHVILLE WARBLER.

(*Helminthophila rubricapilla*.)

LYNDS JONES.

THE Nashville warbler is common during the migrations in many parts of the country, but seems to be scarce or entirely wanting locally. Thus, in Lorain county, Ohio, as well as in Poweshiek county, Iowa, it is

always one of the commonest warblers during the first and second weeks of May, and again during the second and third weeks of September, while it is not reported from Wayne county, Ohio, by Mr. Harry C. Oberholser in his

"List of the Birds of Wayne county, Ohio." There are other instances of its rarity or absence from restricted localities. Its range extends from the Atlantic ocean west to eastern Nebraska, and north into Labrador and the fur countries, occasionally wandering even to Greenland. It winters in the tropics south of the United States.

In the northward migration it reaches Texas about the third week in April and Manitoba near the end of the first week in May, thus passing completely across the country in about three weeks. A careful computation proves that the average rate at which this warbler traveled across the country, in the spring of 1885, was nearly forty miles a day. A single year, however, might show a considerable departure from the normal rate of migration. This instance is given to show any who may not be familiar with the phenomena of bird migration that small birds, at least, do not perform their whole migration in a single flight, but rest a good deal by the way.

The migrating Nashville warblers, in my experience, prefer the outskirts of the larger woods, but may be found anywhere in the smaller woods, preferring the middle branches, rarely ascending to the tree-tops, not seldom gleaning near the ground in the underbrush, or even among the leaves on the ground. They are by no means confined to the woods, but glean as boldly and sing as cheerfully among the fruit and shade trees in town, but they are more numerous in the woods.

The song has been compared to that of the chestnut-sided warbler and the chipping sparrow combined. To my ear the Nashville warbler's song is enough unlike the song of any other bird to be easily recognized after a single hearing. Rev. J. H. Langille's rendering: "*Ke tsee, ke tsee, ke tsee, chip ee, chip ee, chip ee, chip,*" is a close approximation, but seems somewhat lacking in the true expression of the first part of the song. My note book renders it thus: "*K tsip, k tsip, k tsip, k tsip, chip ee, chip ee, chip.*" The first part of the song is thus

halting, with a considerable pause between the phrases, while the last part is uttered more rapidly and with little effort. This song, issuing from the trees in every direction, is always closely associated in the writer's mind with the early morning hours, the dripping trees and the sweet incense of the flower-decked woods and bursting buds.

While feeding, these warblers often gather into groups of a dozen or twenty individuals, and may be associated with other species, thus forming a considerable company. The warbler student is familiar with the waves of warblers and other small birds which range through the woods, now appearing in a bewildering flutter of a hundred wings, now disappearing in their eager quest for a lunch of insects.

The breeding-range of this warbler extends as far south as Connecticut in the East, and Michigan and Minnesota, if not northern Iowa in the West, and north to the limit of its range. In common with the other members of this genus, the Nashville warbler nests on the ground, usually in a spot well protected by dried grasses and other litter of the previous year's growth, often in a tangle of shrubs, ferns and bushes. The nest is sometimes sunk flush with the surface, and is composed of grasses, mosses, pine needles, strips of bark and leaves, lined with finer material of the same sort and with hair-like rootlets, the composition varying with the locality. The eggs are pure white or creamy-white, marked with spots and dots of reddish-brown and the usual lilac shell-markings, which are grouped more or less around the larger end. They are four or five in number, and average about .61 x .48 of an inch.

The spring males may readily be recognized in the bush by their small size, by the bright yellow underparts, by their ashy heads and back, and by their habit of feeding in the middle branches of the trees down to the underbrush. The concealed rufous spot on the crown, from which the bird takes its scientific specific name, can rarely be seen in the live bird, no doubt chiefly because the bird is perpetually above you.





CHIEF SIMON POKAGON.

C. C. MARBLE.

Gather him to his grave again,
And solemnly and softly lay
Beneath the verdure of the plain,
The warrior's scattered bones away.

—Bryant.

THE subject of this brief sketch died, January —, 1899, at an advanced age. He was a full-blood Indian, and a hereditary chief of the Pottowattomies. As author of "The Red Man's Greeting," a booklet made of white birch bark and entitled by the late Prof. Swing, "The Red Man's Book of Lamentations," he has been called the "Red-skin poet, bard, and Longfellow of his race." He himself said that his object in having the book printed on the bark of the white birch tree was out of loyalty to his people, and "gratitude to the Great Spirit, who in his wisdom provided for our use for untold generations this remarkable tree with manifold bark used by us instead of paper, being of greater value to us as it could not be injured by sun or water." Out of the bark of this wonderful tree were made hats, caps, and dishes for domestic use, "while our maidens tied with it the knot that sealed their marriage vow." Wigwams were made of it, as well as large canoes that out-rode the violent storms on lake and sea. It was also used for light and fuel at the Indian war councils and spirit dances. Originally the shores of the northern lakes and streams were fringed with it and evergreen, and the "white charmingly contrasted with the green mirrored from the water was indeed beautiful, but like the red man, this tree is vanishing from our forests." He quotes the sad truth:

"Alas for us! Our day is o'er,
Our fires are out from shore to shore;
No more for us the wild deer bounds—
The plow is on our hunting grounds.
The pale-man's sail skims o'er the floods;
Our pleasant springs are dry;
Our children look, by power oppressed,
Beyond the mountains of the west—
Our children go—to die."

The dedication of the little book is characteristic of the grateful apprecia-

tion of a man of lofty spirit, who was acquainted with the history and traditions of his race. It is: "To the memory of William Penn, Roger Williams, the late lamented Helen Hunt Jackson, and many others now in heaven, who conceived that noble spirit of justice which recognizes the brotherhood of the red man, and to all others now living defenders of our race, I most gratefully dedicate this tribute of the forest."

Chief Pokagon's father sold the site of Chicago and the surrounding country to the United States in 1833 for three cents an acre. Chief Simon was the first red man to visit Mr. Lincoln after his inauguration as president. In a letter written home at the time, he said: "I have met Lincoln, the great chief; he is very tall, has a sad face, but he is a good man; I saw it in his eyes and felt it in his hand-grasp. He will help us get payment for Chicago land." Soon after this visit to Washington a payment of \$39,000 was made by the government.

In 1874 he visited President Grant, of whom he said: "I expected he would put on military importance, but he treated me kindly, gave me a cigar, and we smoked the pipe of peace together."

In 1893 the chief secured judgment against the United States for over \$100,000, which still remained due on the sale of Chicago land by his father. This judgment was paid and the money divided pro rata among members of the tribe, who soon dissipated it, however, and became as great a charge upon the chief as ever.

Pokagon was honored on Chicago Day at the World's Fair by first ringing the new Bell of Liberty and speaking in behalf of his race to the greatest multitude, it is believed, ever assembled in one inclosure. After his

speech, "Glory Hallelujah" was sung before the bell for the first time on the fair grounds. The little book, "The Red Man's Greeting," above referred to, was prepared for this occasion and read for the first time. It was well received, and many papers referred to it in terms of extravagance. It was undoubtedly full of eloquence characteristic of the aborigines.

Chief Pókagon's contributions to bird literature have been numerous and original. That he was a lover of nature is manifest through all his writings. And he was a humane man, like Johnny Appleseed, after quoting:

"An inadvertant step may crush the snail
That crawls at evening in the public path;
But he that hath humanity, forewarn'd,
Will tread aside, and let the reptile live."

"In early life," he says, "I was deeply mortified as I witnessd the grand old forests of Michigan, under whose shades my forefathers lived and died, falling before the cyclone of civilization as before the prairie fire. In those days I traveled thousands of miles along our winding trails, through the wild solitude of the unbroken forest, listening to the song of the woodland birds, as they poured forth their melodies from the thick foliage above and about me. Very seldom now do I catch one familiar note from those early warblers of the woods. They have all passed away, but with feelings of the deepest gratitude I now listen to the songs of other birds which have come with the advance of civilization. They are with us all about our homes and, like the wild-wood birds which our fathers used to hold their breath to hear, they sing in concert, without pride, without envy, without jealousy—alike in forest and field; alike before the wigwam and the castle; alike for savage and for sage; alike for beggar and for prince; alike for chief and for king."

Writing of the wild goose, he says: "I begged my father to try and catch me a pair of these birds alive, that I might raise a flock of them. He finally promised me he would try, and

made me pledge myself to kindly care for them. He made me a stockade park to put them in, enclosing one-half acre of land. One corner ran into the lake, so as to furnish plenty of water for the prospective captives. He then made a brush box, three feet square, trimming it with rice straw from the lake and left it at the water's edge for future use. He then waded into the lake where geese were in the habit of feeding, finding the water nowhere above his chin. On the following morning a flock was seen feeding in the lake. We went quietly to the shore; father placed the box over his head and waded carefully into the water. Soon I could see only the box; it appeared to be floating and drifted by the wind toward the geese. At length it moved in among the great birds. I held my breath, fearing they would fly away. Soon I saw one disappear, then another, both sinking like lead into the water. Not a sound could I hear. The rice box began to slowly drift back. On nearing the shore father emerged from it with a live goose under each arm. They seemed the most beautiful creatures I had ever seen." The young chief in three years raised a fine flock of geese, which, he says, he treated as prisoners of war, and was as kind to as a mother to her children. He taught them to eat corn from his hand and each one to recognize a name given to it. After the first year he gave them their liberty, except in fall and spring, when they were determined to migrate. If he let them out with wings clipped, so they could not fly, they would start on the journey afoot for the south or northland according to the time of year.

It is believed that the old chief left behind him many interesting manuscripts. One of thirty thousand words is known to the present writer. It is autobiographical and historical of the Pottowattomie tribe of Indians, and will doubtless be printed, sooner or later, if not on white birch bark, then on good white paper.

NATURE AT FIRST HAND.

When beauty, blushing, from her bed
Arose to bathe in morning dew,
The sun, just lifting up his head,
The vision saw and back withdrew
Behind a cloud, with edges red:
"Till beauty," then he coyly said,
"Shall veil her peerless form divine
I may not let my glory shine."

C. C. M.

AS TO the pleasures derived from pursuing the science of ornithology in nature's interminable range, there are delights the field ornithologist experiences quite unknown to his stay-at-home namesake. For instance, what a thrill of pride courses through him as he clings to the topmost branches of the tallest pine tree, making himself acquainted with the rude cradle of the sparrow-hawk; or when examining the beautiful and richly marked eggs of the windhover, laid bare and nestless in the magpie's old abode, some sixty feet or more in the branches of a towering oak. When, if ever, do our closet naturalists inspect these lovely objects in their elevated cradle? Again, how elated the field naturalist will feel when, after hours of patient watching, he gets a sight of a troop of timid jays, or the woodpecker, busy in his search for food on some noble tree! How elated when, scaling the cliff's rugged side in search of sea birds' eggs, or tramping over the wild and barren moor, he flushes the snipe or ring ousel from its heathery bed, or startles the curlew from its meal in the fathomless marsh! We might enlarge upon this subject *ad infinitum*, but to a field naturalist these pleasures are well known, and to the closet personage uncared for. Suffice it to say, that he who takes nature for his tutor will experience delights indescribable from every animate and inanimate object of the universe; from the tiny blade of grass to the largest forest tree—the tiniest living atom, seemingly without form or purpose, to its gigantic relation of much higher development. The pages of nature's mighty book are unrolled to the view of every man who cares to haunt her sanctuaries. The doctrine it teaches is universal, preg-

nant with truth, endless in extent, eternal in duration, and full of the widest variety. Upon the earth it is illustrated by endless forms beautiful and grand, and in the trackless ether above, the stars and suns and moons gild its immortal pages.—*Rural Bird-Life in England*.

The aspects of nature change ceaselessly, by day and by night, through the seasons of the year, with every difference in latitude and longitude; and endless are the profusion and variety of the results which illustrate the operation of her laws. But, let the productions of different climes and countries be never so unlike, she works by the same methods; the spirit of her teachings never changes; nature herself is always the same, and the same wholesome, satisfying lessons are to be learned in the contemplation of any of her works. We may change our skies, but not our minds, in crossing the sea to gain a glimpse of that bird-life which finds its exact counterpart in our own woods and fields, at the very threshold of our own homes.—*Coues*.

The boy was right, in a certain sense, when he said that he knew nature when she passed. Alone, he had hunted much in the woods day and night. He knew the tall trees that were the coons' castles, and the high hills of the 'possum's rambles. He had a quick eye for the smooth holes where the squirrels hid or the leafy hammocks where they dozed the heated hours away. The tangles where the bob-whites would stand and sun themselves stood out to him at a glance, and when the ruffed grouse drummed he knew his perch and the screens to dodge behind as he crept up on him.—*Baskett*.

I DREAMED that I stepped into a vast, subterranean, highly arched hall. A brilliant light illuminated it. In the middle of this hall was seated the majestic figure of a woman, clothed in a green robe that fell in many folds around her. Her head rested upon her hand; she seemed to be sunk in deep meditation. Instantly I comprehended that this woman must be nature herself, and a sudden feeling of respectful terror stole into my awed soul. I approached the woman, and, saluting her with reverence, said:

"O mother of us all, on what dost thou meditate? Thinkest thou, perchance, on the future fate of humanity, or of the path along which mankind must journey in order to attain the highest possible perfection—the highest happiness?"

The woman slowly turned her dark, threatening eyes upon me. Her lips moved and, in a tremendous, metallic voice she replied:

"I was pondering how to bestow greater strength upon the muscles of the flea's legs, so that it may more rapidly escape from its enemies. The balance between attack and flight is deranged; it must be readjusted."

"What!" I answered, "is that thy only meditation? Are not we, mankind, thy best-loved and most precious children?"

The woman slightly bent her brows and replied: "All living creatures are my children; I cherish all equally, and annihilate all without distinction."

"But Virtue, Reason, Justice!" I faltered.

"Those are human words," replied the brazen voice. "I know neither good nor evil. Reason to me is no law. And what is justice? I gave thee life; I take it from thee and give it unto others; worms and men are all the same to me. . . . And thou must

maintain thyself meanwhile, and leave me in peace."

I would have replied, but the earth quaked and trembled, and I awoke.

I was returning from hunting, and walking along an avenue of the garden, my dog running in front of me.

Suddenly he took shorter steps, and began to steal along as though tracking game.

I looked along the avenue, and saw a young sparrow, with yellow about its beak and down on its head. It had fallen out of the nest (the wind was violently shaking the birch trees in the avenue) and sat unable to move, helplessly flapping its half-grown wings.

My dog was slowly approaching it, when, suddenly darting from a tree close by, an old dark-throated sparrow fell like a stone right before his nose, and all ruffled up, terrified, with despairing and pitiful chirps, it flung itself twice towards the open jaws of shining teeth. It sprang to save; it cast itself before its nestling, but all its tiny body was shaking with terror; its note was harsh and strange. Swooning with fear, it offered itself up!

What a huge monster must the dog have seemed to it! And yet it could not stay on its high branch out of danger. . . . A force stronger than its will flung it down.

My Tresor stood still, drew back. . . . Clearly he, too, recognized this force.

I hastened to call off the disconcerted dog, and went away full of reverence.

Yes; do not laugh. I felt reverence for that tiny heroic bird for its impulse of love.

Love, I thought, is stronger than death or the fear of death. Only by it, by love, life holds together and advances.

THE BLUEBIRD.

Soft warbling note
From azure throat,
Float on the gentle air of spring;
To my quick ear
It doth appear
The sweetest of the birds that sing.

—C. C. M.

A bit of heaven itself.—*Spofford*.

The bluebird carries the sky on his back.—*Thoreau*.

Winged lute that we call a bluebird.
—*Rexford*.

The bluebird is the color-bearer of the spring brigade.—*Wright*.

A wise bluebird
Puts in his little heavenly word.
—*Lanier*.

The bluebird, shifting his light load of song
From post to post along the cheerless fence.
—*Lowell*.

It is his gentle, high-bred manner and not his azure coat which makes the bluebird.—*Torrey*.

How can we fail to regard its azure except as a fragment from the blue of the summer noonday arch?—*Silloway*.

The bluebird always bears the national colors—red, white, and blue—and in its habits is a model of civilized bird-life.—*Dr. Cooper*.

At the first flash of vernal sun among the bare boughs of his old home he hies northward to greet it with his song, and seems, unlike the oriole, to help nature make the spring.—*Baskett*.

As he sits on a branch lifting his wings there is an elusive charm about his sad, quivering *tru-al-ly, tru-al-ly*. Ignoring our presence, he seems pre-occupied with unfathomable thoughts of field and sky.—*Merriam*.

And yonder bluebird, with the earth tinge on his breast and the sky tinge on his back, did he come down out of heaven on that bright March morning when he told us so softly and plaintively that if we pleased, spring had come?—*Burroughs*.

He is "true blue," which is as rare a color among birds as it is among flowers. He is the banner-bearer of bird-land also, and loyally floats the tricolor from our trees and telegraph wires; for, besides being blue, is he not also red and white?—*Coues*.

THE FIRST BLUEBIRD.

Jest rain and snow! and rain again!
And dribble! drip! and blow!
Then snow! and thaw! and slush! and then
Some more rain and snow!

This morning I was 'most afeared
To wake up—when, I jing!
I seen the sun shine out and heerd
The first bluebird of spring!

Mother she'd raised the winder some;
And in acrost the orchard come,
Soft as an angel's wing,
A breezy, treesy, beesy hum,
Too sweet fer anything!

The winter's shroud was rent apart—
The sun burst forth in glee—
And when *that bluebird* sung, my heart
Hopped out o' bed with me!

—*Riley*.

THE KIT FOX.

C. C. M.

ONE of the smallest of the foxes is the kit fox (*Vulpes velox*), sometimes called the swift fox and also the burrowing fox, getting the latter name for the ability and rapidity with which it digs the holes in the ground in which it lives. It is an inhabitant of the northwestern states and of the western Canadian provinces, covering the region from southeastern Nebraska northwest to British Columbia. Its length is about twenty inches, exclusive of the tail, which is about twelve inches long. The overhair is fine, the back is a pure gray, the sides yellow, and the under parts white. The ears are small and covered with hair and the soles are also hairy. The kit fox is much smaller in size than either the gray or red fox, but has proportionately longer limbs than either of them.

Reynard, of all animals, in spite of the fact that he is accepted as the emblem of cunning, slyness, deceit, and mischief, is praised by proverb and tradition, and the greatest of German poets, Goethe, made him the subject of an epic. Pechuel-Loesche says:

"The fox of tradition and poetry and the fox in real life are really two very different animals. Whoever observes him with an unprejudiced mind fails to discover any extraordinary degree of that much-praised presence of mind, cleverness, cunning, and practical sense, or even an unusually keen development of the senses. In my opinion he is by no means superior in his endowments to other beasts of prey, especially the wolf. The most that can be truly said in his praise is to admit that, when he is pursued, he knows how to adapt himself to the surrounding circumstances, but scarcely more so than other sagacious animals. Like many other animals, including the harmless species, some old foxes may have their wits unusually sharpened by experience, but every huntsman who has had much to do with foxes will ad-

mit that there are a great many which are not ingenious, and some which may even be called stupid, and this refers not only to young, inexperienced foxes, but also to many old ones. The fox is a rascal and knows his trade, because he has to make a living somehow. He is impudent, but only when driven by hunger or when he has to provide for his little family; and in bad plights he shows neither presence of mind nor deliberation, but loses his head completely. He is caught in clumsy traps, and this even repeatedly. In the open country he allows a sled to approach him within gunshot; he permits himself to be surrounded in a hunt in spite of the noise and shots, instead of wisely taking to his heels; in short, this animal, which is more relentlessly pursued than any other inhabitant of the woods, still has not learned to see through all the tricks of men and shape his actions accordingly."

All of which may be literally true, nevertheless Reynard is the hero of a hundred stories and pictures and he will continue to be regarded as a remarkably clever and interesting animal.

The coat of the fox corresponds closely to his surroundings. Those species living on plains and deserts show the similarity of their color with that of the ground; the southern fox differs considerably from the northern and the fox of the mountains from that of the plains.

The fox usually selects his home in deep hollows, between rocks covered with branches, or between roots of trees. Whenever he can avoid doing so he does not dig a burrow himself, but establishes himself in some old, deserted badger's hole, or shares it with the badger in spite of the latter's objections. If it is possible, the fox excavates his burrows in mountain walls, so that the conduits lead upwards, without running close to the surface. In his prowlings he regards his security as paramount to every other considera-

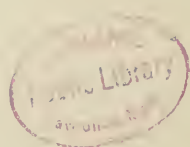


FROM COL. CHAS. ACAS SCIENCES.

SWIFT FOX.
Life-size.

COPYRIGHT 1899,
NATURE STUDY PUB. CO., CHICAGO.

LIBRARY
PUBL. LIBRARY



tion, according to fox hunters. He is suspicious, and only the pangs of hunger can goad him into reckless actions. Then he becomes bold. Once a fox, which was being hunted by hounds and had twice heard the shot whizzing by, seized a sick hare in his flight and carried it with him a considerable distance. Another was surrounded in a field; he came out, attacked a wounded hare, killed it before the eyes of the huntsmen, rapidly buried it in the snow, and then fled directly through the line formed by the sportsmen.

Litters of young foxes are born about the end of April or the beginning of May. Their number varies between three and twelve.

Lenz had a tame female fox which he received just as she was beginning to eat solid food, but had already become so vicious and so much addicted to biting that she always growled when eating her favorite food and bit right and left into straw and wood, even when nobody was disturbing her. Kind treatment soon made her so tame that she would allow him to take a freshly-killed rabbit out of her bloody mouth and insert his fingers instead. Even when grown up she liked to play with him, was demonstrative in her joy when he visited her,

wagged her tail, whined, and jumped around. She was just as much pleased to see a stranger, and she distinguished strangers at a distance of fifty paces, when they were turning the corner of the house, and with loud cries would invite them to come up to her, an honor which she never accorded either to him or his brother, who usually fed her, probably because she knew they would do so anyway.

Reynard has been known to attack and kill young calves and lambs, and if the seashore is near will revel in oysters and shellfish. A group of rabbits are feeding in a clover-patch. He'll crawl along, nibbling the juicy flowers until near enough to make a grab. He'll stalk a bird, with his hind legs dragging behind him, until near enough to spring. How farmers dread his inroads in the poultry yard! Fasten the yard up tight and he will burrow a winding passage into the ground beneath and suddenly appear among the drowsy chickens and stupid geese, whose shrill and alarmed cries arouse the farmer from his bed to sally forth, finding all safe. Then the fox will sneak back and pack away with the plumpest pullet or the fattest goose.

AMONG ANIMALS.

The deer really weeps, its eyes being provided with lachrymal glands.

Ants have brains larger in proportion to the size of their bodies than any other living creature.

There are three varieties of the dog that never bark—the Australian dog, the Egyptian shepherd dog and the "lion-headed" dog of Tibet.

The insect known as the water boatman has a regular pair of oars, his legs being used as such. He swims on his back, as in this position there is less resistance to his progress.

Seventeen parcels of ants' eggs from Russia, weighing 550 pounds, were sold in Berlin recently for 20 cents a pound.

The peacock is now kept entirely, it would seem, for ornament—for the or-

namement of garden terraces (among old-fashioned and trim-kept yew hedges he is specially in place)—in his living state, and for various æsthetic uses to which his brilliant plumage and hundred-eyed tailfeathers are put when he is dead or moulting. But we seldom eat him now, though he used to figure with the boar's head, the swan and the baron of beef on those boards which were beloved by our forefathers, more valiant trenchermen than ourselves. Yet young peahen is uncommonly good eating, even now, at the end of the nineteenth century, and in the craze that some people have for new birds—Argus pheasants, Reeve's pheasants, golden pheasants and what not—to stock their coverts, it is a wonder that some one has not tried a sprinkling of peacocks.

SPRING FASHIONS.

ELLA GILBERT IVES.

EVEN in birddom some of the styles come from Paris, where the *rouge gorge* smartens up his red waistcoat as regularly as the spring comes round. Our staid American robin tries to follow suit, though he never can equal his old-world models. Even the English red-breast excels him in beauty and song. I must tell the truth, as an honest reporter, though I am not a bit English, and would not exchange our *Merula migratoria* for a nightingale; for beauty is but feather-deep, and when our robin shines up his yellow bill—a spring fashion of his own—the song that comes from it is dearer than the pot of gold at the end of the rainbow. That little relative of his whom our forefathers called the “blue robin,” has the same rufous color in his waistcoat, though it stops so short it always seems as if the stuff must have given out. No Parisian or London dandy set the style for his lovely coat. If ever a fashion came down from heaven, that did; and it came to the fresh, new world and stopped here. No blue-coats perch on the rails in old England; perhaps because there is never clear sky enough to spare for a bird’s back. We have so much on this continent, that half a dozen birds dress in the celestial hue; some of them, like the jay, all the year round.

But indigo bunting, whose summer coat and vest seem interwoven of blue sky and a thunder cloud, and then dipped in a sea-wave of foamy green, is not so lavish of his beauty. His plain wife and children, who dress almost like common sparrows, have only shreds and patches of blue in their attire, and indigo *pater* puts on the same dull shade for his winter overcoat. But in spring, what a spruce old beau he is!—and how he does like to show off in the tasseled oaks! So beautiful is his changeable silk that one half suspects him of borrowing from the peacock’s wardrobe. A grain of that lordly fowl’s disposition may

have mixed with the dye; for if there is a pointed spruce tree near, indigo is sure to perch on the tip-top and sing until you look at him. Still, he loves beauty for beauty’s sake, and is not really vain like the tanager.

That gorgeous bird actually sings, “*Here pretty, pretty here!*” with variations, as if all loveliness focused in his feathers. He arrives just when the tender young foliage of May will half veil his vivid scarlet coat; and as it is less dependent on light than the indigo’s, he does not affect tree-tops, but perches under a spray of golden oak leaves or the delicate green of an elm, and shines like a live coal in a bed of leaves. If he were a British trooper he could not be more resplendent in scarlet and black. Tanager is uniformed first for conquest, then for guard duty. He wears his bright trappings during courting and nesting time, and the rest of the year doffs his scarlet and wears olive-green like that of his modest mate. He still carries black wings and tail, however, to mark his sex.

So does gay little goldfinch, bird of winsome ways and a happy heart. He, too, dresses up for courting; and how do you think he does it? All winter long he has worn an olive-brown coat, as subdued as any finch’s needs to be; but when the willows begin to hint at the fashionable spring color, and the spice bush breathes its name, and the dandelions print the news on the grass and the forsythia emblazons it on every lawn, and the sunset sky is a great bulletin board to announce it—then this dainty bird peels off his dull winter overcoat, each tiny feather dropping a tip, and lo! underneath a garb that a Chinese Chang might covet. To match his wings and tail, he puts on a black cap, and then you never saw a more perfect “glass of fashion and mold of form”—at least that is Mme. Goldfinch’s opinion.

“*No dis-pu-ting a-bout tastes!*” chirps chipping sparrow. He prefers a dress of sober tints and thinks nothing so

endurable as gray and black and brown. Though not a slave to fashion, he does freshen up a bit in the spring and puts on a new cap of chestnut, not to be too old foggyish. But he believes in wearing courting clothes all the year round. Young chippies put on striped bibs until they are out of the nursery, but the old folks like a plain shirt front.

No such notion has the barn-swallow. He believes in family equality, even in the matter of clothes; and having been born in a pretty and becoming suit, wears it all the time. When the cinquefoil fingers the grass, you may look for his swallow-tailed coat in the air; and if the April sun strikes its steel-blue broadcloth, and discloses the bright chestnut muffler and the pale-tinted vest, you will rejoice that old fashions prevail in swallow-land. These swift-flying birds have something higher to think about than changing their clothes.

It seems otherwise with some birds of the meadow. That gay dandy, the bobolink, for instance, lays himself out to make a sensation in the breast of his fair one. When he started on his southern trip last autumn, he wore a traveling-suit of buff and brown, not unlike Mistress Bobolink's and the little Links'. No doubt he knew the danger lurking in the reeds of Pennsylvania and the rice-fields of Carolina, and hoped to escape observation while fattening there. In the spring, if fortunate enough to have escaped the gunner, he flies back to his northern home, "dressed to kill," in human phrase, happily not, in bird language. Robert o'Lincoln is a funny fellow disguised as a bishop. Richard Steele, the rollicking horse-guardsman, posing as a Christian hero, is a human parallel. With a black vest buttoned to the throat, a black cap and choker, bobolink's front is as solemn as the end-man's at a minstrel show. But what a coat! Buff, white and black in eccentric combination; and at the nape of the neck, a yellow posy, that deepens with the buttercups and fades almost as soon. Bobby is original, but he conforms to taste, and introduces no discordant color-tone into his field of buttercups and clover. In his ecstatic

flight he seems to have caught a field flower on his back; and if a golden-hearted daisy were to speak, surely it would be in such a joyous tongue.

A red, red rose never blooms in a clover meadow, and the grosbeak does not go there for his chief spring adornment. Red roses do bloom all the year, though none so lovely as the rose of June; and so the grosbeak wears his distinctive flower at his throat the round year, but it is loveliest in early summer. I do not know a prettier fashion—do you?—for human kind or bird, than a flower over the heart. I fancy that a voice is sweeter when a breast is thus adorned. If ever the rich passion of a red, red rose finds expression, it is in the caressing, exultant love-song of the rose-breasted grosbeak. The one who inspires it looks like an overgrown sparrow; but grosbeak knows the difference, if you do not. If that wise parent should ever be in doubt as to his own son, who always favors the mother at the start, he has but to lift up the youngster's wings, and the rose-red lining will show at once that he is no common sparrow.

That pretty fashion of a contrast in linings is not confined to the grosbeak. The flicker, too, has his wings delicately lined with—a scrap of sunset sky. I do not know whether he found his material there or lower down in a marsh of marigolds; but when he flies over your head into the elm tree and plies his trade, you will see that he is fitly named, golden-winged woodpecker. He makes no fuss over his spring clothes. A fresh red tie, which, oddly enough, he wears on the back of his neck, a retinting of his bright lining, a new gloss on his spotted vest and striped coat, and his toilet is made. Madame Flicker is so like her spouse that you would be puzzled to tell them apart, but for his black mustache.

The flicker fashion of dressing alike may come from advanced notions of equality; whatever its source, the purple finch is of another mind. He sacrifices much, almost his own identity, to love of variety; and yet he is never purple. His name simply perpetuates a blunder for which no excuse can be offered. Pokeberry is his prevailing

hue, but so variously is it intermingled with brown at different times and seasons and ages, that scarcely two finches look alike. The mother-bird wears the protective colors of the sparrow, while young males seem to be of doubtful mind which parent to copy; and so a purple finch family presents diversity of attire puzzling to a novice.

But why, pray, should a bird family wear a uniform, as if a charity school or a foundling hospital? The gay little warblers are not institutional to that degree. An example of their originality is redstart—another misnamed bird. He wears the colors of Princeton College, or rather, the college wears his; and a lordly male privilege it is, in both cases. His mate contents herself with pale yellow and gray, while the young male waits three years before putting on his father's coat. The first year he wears his mother's dress; the second, a motley betwixt and between; the third, he is a tree "*candelita*," or little torch, lighting up his winter home in a Cuban forest, and bringing Spanish fashions to New England with the May blossoms.

When dame nature in the spring
For her annual opening
Has her doors and windows washed by April
showers;
When the sun has turned the key,

And the loosened buds are free
To come out and pile the shelving rocks with
flowers;

When the maple wreathes her head
With a posy-garland red,
And the grass-blade sticks a feather in his
cap;

When the tassels trim the birch,
And the oak-tree in the lurch
Hurries up to get some fringes for his wrap;

When the willow's yellow sheen
And the meadow's emerald green
Are the fashionable colors of the day;
When the bank its pledges old
Pays in dandelion gold,
And horse-chestnut folds its baby hands to
prayer—

Then from Cuba and the isles
Where a tropic sun beguiles,
And from lands beyond the Caribbean sea,
Every dainty warbler flocks
With a tiny music-box
And a trunk of pretty feathers duty-free.

And in colors manifold,
Orange, scarlet, blue, and gold,
Green and yellow, black, and brown and
grays galore,
They will thread the forest aisles
With the very latest styles,
And a tune apiece to open up the score.

But they do not care to part
With their decorative art,
Which must always have the background of
a tree;
And will surely bring a curse
To a grasping mind or purse,
Since God loves the birds as well as you and
me.

BIRDS THAT DO NOT SING.

SINGING is applied to birds in the same sense that it is to human beings—the utterance of musical notes. Every person makes vocal sounds of some kind, but many persons never attempt to sing. So it is with birds. The eagle screams, the owl hoots, the wild goose honks, the crow caws, but none of these discordant sounds can be called singing.

With the poet, the singing of birds means merry, light-hearted joyousness, and most of us are poetic enough to view it in the same way. Birds sing most in the spring and the early summer, those happiest seasons of the year, while employed in nest-building and in rearing their young. Many of our musical singers are silent all the rest of the year; at least they utter only low chirpings.

Outside of what are properly classed as song birds there are many species that never pretend to sing; in fact, these far outnumber the musicians. They include the water birds of every kind, both swimmers and waders; all the birds of prey, eagles, hawks, owls, and vultures; and all the gallinaceous tribes, comprising pheasants, partridges, turkeys, and chickens. The gobbler of the turkey cock, the defiant crow of the "bob-white," are none of them true singing; yet it is quite probable that all of these sounds are uttered with precisely similar motives to those that inspire the sweet warbling of the song-sparrow, the clear whistle of the robin, or the thrilling music of the wood-thrush.—*Philadelphia Times*.

THE HYACINTH.

I sometimes think that never blows so red
The rose as where some buried Cæsar bled;
That every hyacinth the garden wears
Dropt in her lap from some once lovely head.

—Omar Khayyam.

HYACINTH, also called Jacinth, is said to be "supreme amongst the flowers of spring." It was in cultivation before 1597, and is therefore not a new favorite. Gerard, at the above date, records the existence of six varieties. Rea, in 1676, mentions several single and double varieties as being then in English gardens, and Justice, in 1754, describes upwards of fifty single-flowered varieties, and nearly one hundred double-flowered ones, as a selection of the best from the catalogues of two then celebrated Dutch growers. One of the Dutch sorts, called *La Reine de Femmes*, is said to have produced from thirty-four to thirty-eight flowers in a spike, and on its first appearance to have sold for fifty guilders a bulb. Others sold for even larger sums. Justice relates that he himself raised several very valuable double-flowered kinds from seeds, which many of the sorts he describes are noted for producing freely.

It is said that the original of the cultivated hyacinth (*Hyacinthus orientalis*) is by comparison an insignificant plant, bearing on a spike only a few small, narrow-lobed, wash, blue flowers. So great has been the improvement effected by the florists that the modern hyacinth would hardly be recognized as the descendant of the type above referred to, the spikes being long and dense, composed of a large number of flowers; the spikes not infrequently measure six or seven inches in length and from seven to nine inches in circumference, with the flowers closely set on from bottom to top. Of late years much improvement has been effected in the size of the individual flowers and the breadth of their recurving lobes, as well as in securing increased brilliancy and depth of color. The names of hyacinths are now almost legion, and of all colors, carmine red, dark blue, lilac-pink, blu-

ish white, indigo-blue, silvery-pink, rose, yellow, snow-white, azure-blue. The bulbs of the hyacinths are said to be as near perfection as can be; and if set early in well-prepared soil, free from all hard substances, given plenty of room, and mulched with leaves and trash, which should be removed in the spring, they will be even more beautiful than any description can indicate. When potted for winter bloom in the house, good soil, drainage, and space must be given to them and they must be kept moist and cool, as well as in the dark while forming roots preparatory to blooming. After they are ready to bloom they do best in rooms having a southern exposure, as they will need only the warmth of the sunlight to perfect them. The hyacinth does not tolerate gas and artificial heat.

There is a pretty legend connected with the hyacinth. Hyacinthus was a mythological figure associated with the hyacinthia, a festival celebrated by the Spartans in honor of Apollo of Amyclæ, whose primitive image, standing on a throne, is described by Pausanias. The legend is to the effect that Hyacinthus, a beautiful youth beloved by the god, was accidentally killed by him with a discus. From his blood sprang a dark-colored flower called after him hyacinth, on whose petals is the word "alas." The myth is one of the many popular representations of the beautiful spring vegetation slain by the hot sun of summer. The sister of Hyacinthus is Polyboca, the much-nourishing fertility of the rich Amyclæan valley; while his brother is Cynortas, the rising of the dog (the hot) star. But with the death of the spring is united the idea of its certain resuscitation in a new year. The festival took place on the three hottest days of summer, and its rites were a mixture of mourning and rejoicing.

C. C. M.

A QUARREL BETWEEN JENNY WREN AND THE FLY-CATCHERS.

C. L. GRUBER,
State Normal School, Kutztown, Pa.

FOR a number of years a crested flycatcher has built his nest in a hole in an apple tree in my yard, about twenty feet from a house constructed for the habitation of the wrens. Jenny usually showed no animosity toward her neighbor; but one spring, while nest-building was in progress, she suddenly seemed to have decided that the flycatcher's abode was in too close proximity to her own domicile and deliberately invaded the flycatcher's domains and dumped the materials of his nest on the walk beneath the tree. When the flycatcher returned the air was filled with his protests, while the wren saucily and defiantly answered him from the roof of her own dwelling. The flycatcher immediately proceeded to build anew, but before he had fairly commenced, the pugnacious wren made another raid and despoiled his nest again. This happened a third time; then the flycatcher and his mate took turns in watching and building. While one went out in search of building material the other remained on guard just inside the door. The situation now became exceedingly interesting, and at times ludicrous. Jenny Wren is a born fighter, and can whip most birds twice her size, but she seemed to consider the flycatcher more than a match for her. The first few times after the flycatcher made it his business to stay on guard, the wren would fly boldly to the opening, but would flee just as precipitately on the appearance of the enemy from the inside. After each retreat there was a great deal of threatening, scolding, and parleying, and Jenny several times

seemed fairly beside herself with rage, while the flycatcher coolly whistled his challenge on the other side of the line of neutrality. The wren now adopted different strategy. She flew to the tree from a point where the flycatcher could not see her, then hurried along the limb in which the flycatcher lay concealed and circled around the hole, all the time endeavoring to take a peep on the inside without herself being observed, in the vain hope that her enemy might not be at home. Suddenly there would be a flutter of wings and a brown streak through the air, followed by another as the flycatcher, shot like a bullet from the opening in the tree; but the active marauder was safely hidden amid the grapevines, and the baffled flycatcher returned to his picket line, hurling back epithets and telling Jenny that he would surely catch her next time. In this manner the strife continued for several days. Then a truce seemed to have been arranged. Certainly the flycatcher was still on guard, but the wrens went about their work and did not molest the flycatchers except at long intervals. I thought the flycatchers had conquered; but one morning when I came out, there on the walk were three broken, brown-penciled eggs, nest, snakeskin, and all. The flycatcher had put too much trust in the wren's unconcernedness, and came back to find himself once more without a nest. But Jenny seemed to have desired only one more stroke of revenge, and the flycatchers finally succeeded in raising their family in front of the home of Jenny Wren.

BIRDS AND ALL NATURE.

ILLUSTRATED BY COLOR PHOTOGRAPHY.

VOL. V.

MAY, 1899.

No. 5

THE CEDAR WAXWING.

(*Ampelis cedrorum*.)

LYNDS JONES.

THERE is no more beautiful bird in our northern states, if there be in the whole country, than our waxwing. Many birds are more gorgeously appareled, and with many there are more striking contrasts exhibited, but nowhere do we encounter a texture more delicate covering a bearing more courtly. One despairs of adequately describing the silky softness of the plumage and the beautiful shades of color. But the perfecting of color photography has made that task unnecessary. We may wonder why some crested birds have this regal insignia bestowed upon them by nature, but it would be impossible to think of the waxwing without his crowning glory. Not less characteristic are the horny appendages resembling red sealing wax attached to the secondary wing feathers and sometimes also to the tail feathers. They seem to be outgrowths of the tip of the shaft. These, with the yellow-tipped tail, form the only bright colors in the plumage.

The cedar waxwings are gregarious, except during the breeding-season, wandering about the country in flocks of a dozen individuals, more or less, stopping for any considerable time only where food is plentiful. Their wandering propensities make their presence a very uncertain quantity at any season of the year. During the whole of 1898 they were present in considerable numbers at Oberlin, Ohio, nesting in orchards and shade trees plentifully, but thus far in 1899 very few have been seen. No doubt their presence is not suspected even when they may be numerous, because they do not herald their appearance with a loud voice nor with whistling wing. Their voice ac-

cords perfectly with their attire, their manners are quiet and unassuming, and their flight is well-nigh noiseless. One moment the flock is vaulting through the air in short bounds, the next its members are perched in a treetop with erected crests at attention. If all is quiet without cause for suspicion, the flock begins feeding upon the insect pests, if they are in season; upon the fruit, if that is in season. So compact is the flock, both in flight and while resting, that nearly every member might be taken at a single shot. The birds are so unsuspicious that they can easily be approached, thus presenting a tempting prize to the small hunter who may design the beautiful plumage for some hat decoration.

In common with the goldfinch, the waxwings are late breeders, making their nests in June, July, and August. They seem to prefer rather small trees and low ones, nesting in orchard trees and in ornamental shrubbery as well as in shade trees. The nest is not usually an elaborate affair, but rather loosely made of twigs, grass, rootlets, and leaves, often lined with grape-vine bark, thus hinting that the species has sprung from an original tropical stock, which necessarily makes its nest as cool and airy as practicable. The eggs are unique among the smaller ones, in their steely bluish-gray ground, rather evenly overlaid with dots and scratches of dark brown or black, thus presenting an aggressiveness out of all harmony with the birds. But the peculiar colors and pattern aid greatly in rendering the eggs inconspicuous in the nest, as anyone may prove by noticing them as they lie on their bed of rootlets or leaves. They are usually four in num-

ber in this locality, but may vary somewhat according to the season and individual characteristics.

The food of the waxwing is varied both according to season and other conditions. Wild fruit, berries, and seeds form much of their food during the fall and winter months. Mr. A. W. Butler states that, "in winter nothing attracts them so much as the hackberry (*Celtis occidentalis*). Some years, early in spring, they are found living upon red buds." The investigations of the food of this species by Professor F. E. L. Beal prove that the greater share of it consists of wild fruit or seeds with a very small allowance of cultivated fruits. Animal matter forms a relatively small proportion of the food, but this small proportion by no means indicates the insect-feeding habits of the birds. It might well be suspected that so varied a diet would enable the birds to accommodate themselves to almost any conditions, largely feeding upon the food which happens to be the most abundant at the time. Thus, an outbreak of any insect pest calls the waxwings in large flocks which de-

stroy great numbers to the almost entire exclusion of fruit as a diet for the time. It cannot be denied that the waxwings do sometimes destroy not a little early fruit, calling down upon them righteous indignation; but at other times they more than make amends for the mischief done.

Of the voice Mr. A. W. Butler says, "They have a peculiar lisping note, uttered in a monotone varying in pitch. As they sit among the branches of an early Richmond cherry tree in early June, the note seems to be inhaled, and reminds me of a small boy who, when eating juicy fruit, makes a noise by inhalation in endeavoring to prevent the loss of the juice and then exclaims, 'How good!' As the birds start to fly, each repeats the note three or four times. These notes develop into a song as the summer comes on; a lisping, peculiar song that tells that the flocks are resolving into pairs as the duties of the season press upon them." After the pairing season there is a great show of affection between the two birds, which often continues long after the nesting season has closed.

THE PREACHER-BIRD.

(Red-eyed Vireo.)

JENNY TERRILL RUPRECHT.

LISTEN near a grove of elms or maples and you will not fail to hear its song, a somewhat broken, rambling recitative, which no one has so well described as Wilson Flagg, who calls this bird the preacher, and interprets its notes as "*You see it! You know it! Do you hear me? Do you believe it?*"—Chapman's *Bird-Life*.

Apostle of the grove across the way,
Surpliced in color of the foliage,
I list enchanted to thy sermon-lay,
As if it were the wisdom of a sage;
"*You see it! You know it! Do you hear me? Do you believe it?*"
Ah! thou wouldst quicken memory to-day.

Nor morning's chill, nor noon-tide's languorous heat,

Doth hold thy voice in thrall, O, preacher fair;
Perched on the greenest bough, thy message sweet

Thou pourest out upon the vibrant air,
"*You see it! You know it! Do you hear me? Do you believe it?*"

Over and over in a swift repeat.

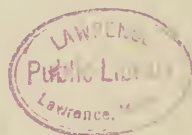
Apostle of the grove! Thy song divine

The God of Nature gave thee note by note,
To gladder, fuller make the message thine,
Rippling in beauty from thy dainty throat.

"*You see it! You know it! Do you hear me? Do you believe it?*"

Would that apostleship so sweet were mine!





COFFEE.

ANNA R. HENDERSON.

COFFEE is a native of Abyssinia, being first used by the natives of the district called Kaffa, whence its name. It is still found wild in parts of Africa.

It was introduced into Arabia in the fifteenth century, and is so well suited to that soil and climate that the Mocha coffee has never been excelled. It became so popular that in 1638 the Mohammedan priests issued an edict against it, as the faithful frequented the coffeeshops more than the mosques.

In 1638 the beverage was sold in Paris, but did not win favor for a few years until it was introduced to the aristocracy by Soliman Aga, the Ambassador of the Sublime Porte at the Court of Louis XIV. Coffee sipping became fashionable, and before the middle of the seventeenth century was the mode in all the capitals of Europe.

Cromwell ordered the closing of the coffee shops of England, but its popularity did not wane.

In 1699 coffee was planted in Batavia and Java. In 1720 three coffee shrubs were sent from the Jardin des Plantes in France to the Island of Martinique.

The voyage was long, and water becoming scarce two of the plants perished, but Captain Declieux shared his ration of water with the other plant, and it lived to become the ancestor of all the coffee groves in America.

On the coat of arms of Brazil which adorns every flag of that country is a branch of coffee, a fit emblem, as Brazil produces three-fourths of the coffee of the world. It was first planted there in 1754, and the first cargo was shipped to the United States in 1809.

It can be grown from seeds or from slips. Shrubs begin bearing the second or third year, and are profitable for fifteen years, some trees continue bearing for twenty-five years.

They are planted six or eight feet apart, and not allowed to grow more than twelve feet high; and are not pruned, so that the limbs bend nearly to the ground. The long slender droop-

ing branches bear dark green, glossy leaves, directly opposite to each other. Between these leaves bloom the flowers; clusters of five or six white star-shaped blossoms, each an inch in diameter. These jessamine-like flowers touch each other, forming a long snowy spray bordered with green. Nothing can exceed the beauty of a coffee grove in bloom, and its fragrance makes it a veritable Eden.

It is beautiful again when the berries are ripe. They resemble a large cranberry, each berry containing two grains, the flat sides together. The fruit is slightly sweet but not desirable. Three crops are gathered in one year. I have in memory a coffee plantation in the mountains of Brazil, where the pickers were African slaves. They made a picturesque sight, picking into white sacks swung in front of them, occasionally emptying the fruit into broad, flat baskets. Each man will pick more than thirty pounds a day, and at sunset they wind down the mountain paths with their broad baskets of red berries balanced on their heads.

The ripe fruit is put through a mill which removes the pulp. The wet berries are then spread to dry in the sun on a floor of hardened earth, brick or slate.

The coffee terrane in my memory was about eighty feet square, laid with smooth slate, and slightly sloping. It had around it a moulding of plaster with spaces of perforated zinc for the escape of water. Orange and fig trees dropped their fruit over its border and it was an ideal spot for a moonlight dance. The coffee house was near, and an approaching cloud was a signal to gather the coffee in.

When dry the grains are put through a mill, or where primitive methods prevail, pounded in a mortar to remove a thin brittle shell which encloses each grain. The coffee is then put into sacks of five *arrobas*, or 160 pounds each and carted to the warehouses of the city.

AN ABANDONED HOME.

BY ELANORA KINSLEY MARBLE.

"Say, was thy little mate unkind,
And heard thee as the careless wind?
Oh! nought but love and sorrow joined
Such notes of woe could waken."

CHAPTER II.

"WELL, I'm glad to get over to this tree again out of the sound of mother's voice. Duty to my husband; that's all she could talk about. All wives help to build the home-nest," she says, "and indeed do the most toward making it snug and comfortable, and that I must give up my old pastimes and pleasures and settle down to housekeeping. Well, if I must, I must, but oh! how I wish I had never got married."

Not a word was exchanged between the pair that night, and on the following morning Mrs. B., with a disdainful toss of her head, ironically announced her willingness to become a hod-carrier, a mason, or a carpenter, according to the desires of her lord.

They elected to build their nest in the maple-tree, and you can imagine the bickerings of the pair as the house progressed. Mrs. B's. groans and bemoaning over the effect, such "fetchings and carryings" would have upon her health, already delicate. How often she was compelled from weakness and fatigue to tuck her head under her wing and rest, while Mr. B. carried on the work tireless and uncomplaining.

"She may change when she has the responsibility of a family," he mused, "and perhaps become a helpmeet after all. I must not be too severe with her, so young and thoughtless and inexperienced."

So the nest at length was completed.

"My!" said a sharp-eyed old lady bird, whose curiosity led her to take a peep at the domicile one day while Mrs. B. was off visiting with one of her neighbors, "such an uncomfortable, ragged looking nest; it is not even domed as a nest should be when built in a tree. And then the lining! If the babies escape drowning in the first down-pour,

I am sure they'll be crippled for life, if not hung outright, when they attempt to leave the nest. You know how dangerous it is when they get their feet entangled in the rag ravelings and coils of string, and if you'll believe me that shiftless Jenny has just laid a lot of it around the edges of the nest without ever tucking it in. The way girls are brought up now-a-days! Accomplishments indeed! I think," with a sniff, "if she had been taught something about housekeeping instead of how to arrange her feathers prettily, to dance and sing, and fly in graceful circles it would have been much better for poor Mr. B. Poor fellow, how I do pity him," and off the old lady flew to talk it over with another neighbor.

Unlike some young wives of the sparrow family, Mrs. B. did not sit on the first almost spotless white egg which she deposited in the nest, but waited till four others, prettily spotted with brown, and black, and lavender lay beside it.

"Whine, whine from morning till night!" cried her exasperated spouse after brooding had begun. "Sitting still so much, you say, doesn't agree with you. Your beauty is departing! You are growing thin and careworn! The little outings you take are only tantalizing. I am sure most wives wouldn't consider it a hardship to sit still and be fed with the delicious grubs and dainty tid-bits which I go to such pains to fetch for you. That was a particularly fine grub I brought you this morning, and you ate it without one word of thanks, or even a look of gratitude. Nothing but complaints and tears! It is enough to drive any husband mad. I fly away in the morning with a heavy heart, and when I see and hear other sparrows hopping and singing cheerfully about their nests, receiving chirps of encouragement and

love from their sitting mates in return, I feel as though—as though I would rather die than be compelled to return to my unhappy home again.”

“Oh, you do?” sarcastically rejoined Mrs. B. “That is of a piece with the rest of your selfishness, Mr. Britisher, I am sure. Die and leave me, the partner of your bosom, to struggle through the brooding season and afterward bring up our large family the best I may. Oh,” breaking into tears, “I wish I had never seen you, I really do.”

“Oh, yes, that has been the burden of your song for days, Mrs. B. I’m sure I have no reason to bless the hour I first laid eyes on you. Why, as the saying goes, Mrs. B., you threw yourself at my head at our very first meeting. And your precious mamma! How she did chirp about her darling Jenny’s accomplishments and sweet amiability. Bah, what a ninny I was, to be sure! Oh, you needn’t shriek and pluck the feathers from your head. Truth burns sometimes, I know, and—oh you are going to faint. Well faint!” and with an exclamation more forcible than polite Mr. B. flew away out of sight and sound of his weeping spouse.

Wearily and sadly did Mrs. B. gaze out of her humble home upon darkening nature that evening. Many hours had passed since the flight of Mr. B., and the promptings of hunger, if nothing else, caused her to gaze about, wistfully hoping for his return. The calls of other birds to their mates filled the air, and lent an additional mournfulness to her lonely situation.

“How glad I shall be to see him,” she thought, her heart warming toward him in his absence. “I’ll be cheerful and pretend to be contented after this, for I should be very miserable without him. I have been very foolish, and given him cause for all the harsh things he has said, perhaps. Oh, I *do* wish he would come.”

Night came down, dark and lonely. The voices and whirrings of her neighbors’ wings had long since given place to stillness as one after another retired for the night. The wind swayed the branches of the tree in which she nested, their groanings and the sharp responses of the leaves filling the

watcher’s mind with gloomy forebodings.

“I am so frightened,” she murmured, “there is surely going to be a storm. Oh, I wish I had listened to Mr. B. and not insisted upon building our home in the crotch of this tree. He said it was not wise, and that we would be much safer and snugger under the eaves or in a hole in the wall or tree. But, no, I said, if I was compelled to stay at home every day and sit upon the nest it should be situated where I could look out and see my neighbors as they flew about. That was the reason I was determined it should not be domed. I wanted to see and be seen. Oh, how foolish I have been! What shall I do? What shall I do? I am afraid to leave the nest even for a minute for fear the eggs will get cold. Mr. B. would never forgive me, then, I am sure. But to stay out here in the storm, all alone. Oh, I shall die, I know I shall.”

Morning broke with all nature, after the rain, smiling and refreshed. Sleep had not visited the eyelids of the forsaken wife and with heavy eyes and throbbing brain, she viewed the rising dawn.

“Alas,” she sighed, as the whirr of wings and happy chirps of her neighbors struck upon her ears, “how can people be joyous when aching hearts and lives broken with misery lie at their very thresholds? The songs and gleeful voices of my neighbors fill me with anger and despair. I hate the world and everybody in it. I am cold and wet and hungry. I even hate the sun that has risen to usher in a new day.

“I must make an effort,” she murmured as the morning advanced and Mr. B. did not return, “and get home to mother. I am so weak I can scarcely stand, much less fly. I am burning with fever, and oh, how my head throbs! Such trouble and sorrow for one so young! I feel as though I shall never smile again.”

She steadied herself upon the edge of the nest and, turning, gazed wistfully and sadly upon the five tiny eggs, which she now sorrowed to abandon.

“I may return,” she sighed, “in time

to lend them warmth, or may find my dear mate performing that office in my absence. I will pray that it may be so as I fly. Praises would be mockery from my throat to-day, mockery!"

* * * * *

"Why, Jenny!" shrieked her mother as Mrs. B. sank down exhausted upon the threshold of her old home. "Whatever is the matter with you, and what has brought you here this time of day?"

"I am hungry and sick, mother, and I feel as though, as though—I am going to die!"

"And where is Mr. Britisher? You've no business to be hungry with a husband to care for you," tartly replied her mother, whilst bustling about to find a grub or two to supply her daughter's wants.

"I have no husband, I fear, mother. He is—"

"Dead!" shrieked the old lady. "Don't tell me Mr. Britisher is dead!"

"Dead, or worse," sadly replied her daughter.

"Worse? Heaven defend us! You don't mean he has deserted you?"

"He left me yesterday afternoon in anger, and has not returned."

"Highty, tifty, that's it, is it? Well, you have brought it all upon yourself and will have to suffer for it. I am sure your father talked enough about idleness and vanity for you to have heeded, and time and time again I have told you that every husband in the sparrow family is a bully and a tyrant, and every wife, if she expects to live happily, must let her mate have his own way."

Mrs. B. sighed, and wearily dropped her head upon her breast.

"You must go back," emphatically said her mother, "before the neighborhood gets wind of the affair. Mr. Britisher may be home this very minute, and glad enough he will be to see you, I am sure. So go back, dear, before the eggs grow cold and your neighbors will be none the wiser."

"I am going, mother, but oh, I feel so ill, so ill!" said the bereaved little

creature as she wearily poised for her flight.

"She does look weakly and sick, poor thing," said the mother with a sigh watching her out of sight, "but I don't believe in interfering between husband and wife. Mr. Britisher, indeed, gave me to understand from the first that the less he saw of his mother-in-law the better, remarking that if that class would only stay at home and manage their own household affairs fewer couples, he thought, would be parted. I considered that a rather broad hint, and in consequence have never visited them since they began housekeeping. He has only gone off in a huff, of course, and everything will come out all right, I am sure."

Ere nightfall, however, motherly anxiety impelled her to fly over to her daughter's home.

Alas, only desolation and ruin were there. At the foot of the tree lay the form of Mrs. B. Exposure, sorrow, and excitement had done their work. It was a lifeless form which met her tearful gaze.

The fate of Mr. Britisher was never known. Rumor assigned his absence to matrimonial infelicity, but his more charitable neighbors, as they dropped a tear to his memory, pictured his mangled form a victim to the wanton cruelty or mischievous sport of some idle boy.

A gentleman passing by one day saw the dismantled nest upon the ground and carelessly stirred it with his cane.

"What is that, uncle?" queried a little maid of some five summers who walked by his side.

"That, little one," came the answer slowly and impressively, "is an abandoned home."

"An abandoned home," I repeated, as his words floated up to my window. "Aye, truly to the casual observer that is all it seems, but, oh, how little do they dream of the folly, the suffering, the sad, almost tragic ending of the wee feathered couple whom I saw build that humble home."



5
1910
1000000

THE CONY.

C. C. M.

THE specimen of this animal presented here (*Hyrax abyssinicus*) is the best-known of the species. It measures from ten to twelve inches in length; the fur consists of somewhat long, fine hairs, gray-brown at the base, lighter gray in the middle portions, merging into a dark-brown surmounted by a light-colored tip, the resulting general color of this combination being a mottled pale-gray.

The Book of Proverbs, enumerating four animals which it describes as "exceeding wise," says: "The conies are but a feeble folk, yet they make their houses in the rocks." The conies are mentioned by various writers as well-known animals in days of remotest antiquity. They are found in the wild, desolate mountain regions of Africa and western Asia, and the variety inhabiting Syria and Palestine is probably referred to in the Hebrew text of the Bible under the name of "laphan," which Luther translated by the word "rabbit," and in the authorized and revised versions is rendered "cony." They inhabit all the mountains of Syria, Palestine, and Arabia, perhaps also of Persia, the Nile country, east, west, and south Africa, frequently at elevations of six thousand or nine thousand feet above sea-level, and "the peaks and cones that rise like islands sheer above the surface of the plains—the presence of the little animals constituting one of the characteristic features of the high table-lands of north-eastern Africa." It is stated that if the observer quietly passes through the valleys he sees them sitting or lying in rows on the projecting ledges, as they are a lazy, comfort-loving tribe and like to bask in the warm sunshine. A rapid movement or unusual noise quickly stampedes them, and they all flee with an agility like that usual among rodents, and almost instantly disappear. A traveler says of them, that in the neighborhood of villages, where they are also to be found, they show little fear of the

natives, and boldly attend to their affairs as if they understood that nobody thinks of molesting them; but when approached by people whose color or attire differs from that of their usual human neighbors, they at once retreat to their holes in the rocks. A dog inspires them with greater fear than does a human being. When startled by a canine foe, even after they have become hidden, safe from pursuit, in their rocky crevices, they continue to give utterance to their curious, tremulous yell, which resembles the cry of small monkeys.

Brehm confirms the statement of another traveler, who called attention to the striking fact that the peaceable and defenseless cony lives in the permanent society and on the best of terms with a by no means despicable beast of prey, a variety of mongoose.

In regard to their movements and mental characteristics, the conies have been placed between the unwieldy rhinoceros and the nimble rodent. They are excellent climbers. The soles of the feet are as elastic and springy as rubber, enabling the animal to contract and distend the middle cleft or fissure of its sole-pad at will, and thereby to secure a hold on a smooth surface by means of suction. In behavior the conies are gentle, simple, and timid. The social instinct is highly developed in them, and they are rarely seen alone.

The conies have been regarded as the smallest and daintiest of all the existing species of odd-toed animals. Naturalists, however, have held widely divergent opinions as to the classification of the pretty cliff-dwellers. Pallas, because of their habits and outward appearance, called them rodents. Oken thought them to be related to the marsupials, or pouched animals. Cuvier placed them in his order of "many-toed animals," which classification has also been disputed, and Huxley has raised them to the dignity of representatives of a distinct order. Who shall decide where all pretend to know?

COFFEE.

(*Coffea Arabica* L.)

DR. ALBERT SCHNEIDER,
Northwestern University School of Pharmacy.

"Directly after coffee the band began to play."

—Greville, *Memoirs*, June 5, 1831.

COFFEE is the seed of a small evergreen tree or shrub ranging from 15 to 25 feet in height.

The branches are spreading or even pendant with opposite short petioled leaves, which are ovate, smooth, leathery, and dark green. The flowers are perfect, fragrant, occurring in groups of from three to seven in the axils of the leaves. The corolla is white, the calyx green and small. The ovary is green at first, changing to yellowish, and finally to deep red or purple at maturity. Each ovary has two seeds, the so-called coffee beans.

The coffee tree is a native of the tropical parts of Africa, in Abyssinia and the interior. The Arabians were among the first to transport it to their native country for the purposes of cultivation. From Arabia it was soon transplanted to other tropical countries.

The name coffee (*Kaffee*, Ger., *Caféier*, Fr.) was supposed to have been derived from the Arabian word *Kahwah* or *Cahual*, which referred to the drink made from the coffee beans as well as to wines. It is now generally believed that the word was derived from Kaffa, a country of the Abyssinian highlands where the plant grows wild very abundantly.

From Kaffa the coffee plant found its way into Persia about the year 875, and still later into Turkey. According to popular belief, the drink coffee was the invention of the Sheik Omar in 1258. Others maintain that the drink was not known until even a later period. The mufti, Gemal Eddin of Aden, made a trip to Persia in 1500, where he learned the use of coffee as a drink, and introduced it into his own country for the special purpose of sup-

plying it to the dervishes to make them more enduring in their prayers and supplications. In 1511 coffee had already become a popular drink in Mecca. About this time Chair Beg, the governor of Mecca, issued an edict proclaiming coffee-drinking injurious and making the use of coffee a crime against the laws of the Koran. It was prophesied that on the day of judgment the faces of coffee drinkers would be blacker than the pot in which the coffee was made. As a result of this crusade the coffee houses were closed; the coffee plantations were destroyed, and offenders were treated to the bastinado or a reversed ride on a donkey. The next governor of Mecca again opened the coffee houses, and in 1534 Sultan Soliman opened the first coffee houses in Constantinople, which were, however, again closed by Sultan Murad II., but not for long. In 1624 Venetian merchants brought large quantities of coffee into northern Italy. In 1632 there were 1,000 public coffee houses in Cairo. In 1645 coffee-drinking had already become very common in southern Italy. A Greek named Pasqua erected the first coffee house in London (1652). Coffee houses appeared in other cities in about the following order: Marseilles, 1671; Paris, 1672; Vienna, 1683; Nürnberg and Regensburg, 1686; Hamburg, 1687; Stuttgart, 1712; Berlin, 1721. In 1674 the ladies of London petitioned the government to suppress the coffee houses. To discourage the use of coffee it was maintained that the drink was made from tar, soot, blood of Turks, old shoes, old boots, etc.

These coffee houses were of great significance, as may be gathered from the rapidity with which they spread and the general favor with which they

were received. They were visited, not so much on account of the drink that was dispensed there, but rather for the purpose of discussing political situations; they constituted the favorite meeting-places for anarchists, revolutionaries, and high-class criminals. At times it even became necessary to close them entirely in order to check or suppress political intrigues or plottings against the government. At the present time the saloons take the place of coffee houses in most countries, and many of them are still the hotbeds of anarchy and crime. In Turkey, where alcoholic drinks are prohibited, coffee houses have full swing.

The Dutch again seemed to have been the first to attempt the cultivation of the coffee plant. In 1650 they succeeded in transplanting a few trees from Mecca to Batavia. From 1680 to 1690 the island already had large plantations; others were soon started in Ceylon, Surinam, and the Sunda islands. About 1713 Captain Desclieux carried some plants to the French possessions of the West Indies (Martinique). It is reported that only a single plant reached its destination alive, which is the ancestor of the coffee trees of the enormous plantations of the West Indies and South America.

The plant thrives best in a loamy soil in an average annual temperature of about 27 degrees C., with considerable moisture and shade. Most plantations are at an elevation of 1,000 feet to 2,500 above the sea-level. In order to insure larger yields and to make gathering easier the trees of the South American plantations are clipped so as to keep their height at about 6 feet to 6.5 feet. The yield begins with the third year and continues increasingly up to the twentieth year. The fruit matures at all seasons, and is gathered about three times each year. In Arabia, where the trees are usually not clipped, and hence comparatively large, the fruit is knocked off by means of sticks. In the West Indies and South America the red, not fully matured fruit is picked by hand. The outer hard shell (fruit coat, pericarp) is removed by pressure, rolling, and shaking. The beans are now ready for the market.

All of the different varieties or kinds of coffee found upon the market are from two species of *Coffea*; namely, *C. Arabica* and *C. Liberica*; the latter yielding the Liberian coffee, which is of excellent quality.

There are a number of so-called coffees which are used as substitutes for true coffee, of which the following are the more important. California coffee is the somewhat coffee-like fruit of *Rhamnus Californica*. Crust coffee is a drink resembling coffee in color, made from roasted bread crusts steeped in water. Mogdad or Negro coffee is the roasted seeds of *Cassia occidentalis*, which are used as a substitute for coffee, though they contain no caffeine. Swedish coffee is the seeds of *Astragalus Boeoticus* used as coffee, for which purpose it is cultivated in parts of Germany and Hungary. Wild coffee is a name given to several plants native in India, as *Faramaea odoratissima*, *Eugenia disticha*, and *Casearia laetioides*. Kentucky coffee is a large leguminous tree (*Gymnocladus Canadensis*) of which the seeds (coffee nut) are used as a substitute for coffee.

The coffee beans are roasted before they are in suitable condition for use. At first the green beans were used. According to one story, a shepherd noticed that some of his sheep ate the fruit of the coffee tree, and, as a result, became very frisky. Presuming that the coffee beans were the cause, he also ate of the beans and noted an exhilarating effect. The use of the roasted beans was said to have originated in Holland. Roasting should be done carefully in a closed vessel in order to retain as much of the aroma as possible. This process modifies the beans very much; they change from green or greenish to brown and dark brown and become brittle; they lose about 15 to 30 per cent. of their weight, at the same time increasing in size from 30 to 50 per cent. The aroma is almost wholly produced by the roasting process, but if continued too long or done at too high a temperature the aroma is again lost. The temperature should be uniform and the beans should be stirred continually. It should also be remembered that not

all kinds or grades of coffee should be roasted alike. In order to develop the highest aroma, Mocha coffee should be roasted until it becomes a reddish yellow, and has lost 15 per cent of its weight. Martinique coffee should be roasted to a chestnut brown, with a loss of 20 percent in weight; Bourbon to a light bronze and a loss in weight of 18 percent.

The various coffee drinks prepared differ very widely in quality. This is dependent upon the varying methods employed in making them. The following method is highly recommended. It is advised to purchase a good quality of the unroasted beans and proceed as follows:

1. *Sorting Berries.*—Carefully remove bad berries, dirt, husks, stones, and other foreign matter usually present in larger or smaller quantities.

2. *Roasting.*—Roast as indicated above. Coat the hot beans with sugar to retain the aromatic principles; cool rapidly and keep in a dry place.

3. *Grinding.*—Grind fine just before the coffee is to be made.

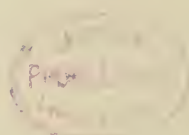
4. *Preparing the Coffee.*—Coffee is usually made according to three methods; by infiltration, by infusion, and by boiling. Coffee by infiltration is made by allowing boiling water to percolate through the ground coffee. It is stated that much of the aroma is lost by this method. In the second process boiling water is poured upon the ground coffee and allowed to stand for some time. This gives a highly aromatic but comparatively weak coffee. In the third process the coffee is boiled for about five or ten minutes. This gives a strong coffee, but much of the aroma is lost. Since these methods do not give an ideal coffee an eminent authority recommends a fourth, as follows: For three small cups of coffee take one ounce of finely ground coffee. Place three-fourths of this in the pot of boiling water and boil for five or ten minutes; then throw in the remaining one-fourth and remove from the fire at once, stirring for one minute. The first portion of the coffee gives strength, the second the flavor. It is not advisable to filter the coffee as it is apt to mod-

ify the aroma. Allow it to stand until the grounds have settled.

Coffee is very frequently adulterated, especially ground coffee. It is stated that the beans have been adulterated with artificial beans made of starch or of clay. It is not uncommon to find pebbles which have been added to increase the weight. Most commonly the beans are not carefully hulled and sorted so that a considerable percentage of spoiled beans and hulls are present. The coffee plant seems to be quite susceptible to the attacks of various pests. The coffee blight is a microscopic fungus (*Hemileia vastatrix*) very common in Ceylon which has on several occasions almost entirely destroyed the coffee plantations. The coffee borer is the larva of a coleopter (*Xylotrechus quadripes*) which injures and destroys the trees by boring into the wood. The pest is most abundant in India, while another borer (*Areocerus coffeæ*) is common in South Africa. Another destructive pest is the so-called coffee bug (*Leucanium coffeæ*).

Ground coffee is adulterated with a great variety of substances. The roasted and ground roots of chicory (*Cichorium intybus*), carrot (*Daucus carota*), beet (*Beta vulgaris*), are very much used. The rush nut (*Cyperus esculentus*), and peanut are also used. A large number of seeds are used for adulterating purposes, as corn, barley, oats, wheat, rye, and other cereals; further, yellow flag, gray pea, milk vetch, astragalus, hibiscus, holly, Spanish broom, acorns, chestnuts, lupin, peas, haricots, horse bean, sun flower, seeds of gooseberry and grape. The seeds of *Cassia occidentalis* known as "wild coffee" are used as a substitute for coffee in Dominica and are said to have a flavor equal to that of true coffee. Sacca or Sultan coffee consists of the husks of the coffee berry, usually mixed with coffee and said to improve its flavor. In Sumatra an infusion is made of the coffee leaves or the young twigs and leaves. This is said to produce a refreshing drink having the taste and aroma of a mixture of coffee and tea. Efforts have been made, especially in England, to introduce leaf coffee with but little success.





As already stated, most of the many varieties of coffee upon the market are obtained from one species, and are usually classified according to the countries from which they are shipped. The following are the most important varieties:

I. African, or Ethiopian Coffee.

1. Abyssinia.
2. Galla.
3. Kaffa.

II. Arabian, Levant, or Mocha Coffee.

1. Bohuri.
2. Sakki.
3. Salabi.

III. Dutch Indian Coffee.

1. Java.
2. Batavia.
3. Tscheribon.
4. Samarang.
5. Menado of the Celebes.
6. Dadepe of the Celebes.
7. Sumatra.

IV. American Indian Coffee.

1. Manila.
2. Cavita.
3. Laguna.
4. Batanges.
5. Mindanao.

V. French Indian, or Bourbon Coffee.

VI. English Indian Coffee.

1. Nilgeri.
2. Madras.
3. Ceylon.
 - a. Native.
 - b. Plantation.

VII. West Indian and Central American Coffee.

1. Cuba (Havana, Santiago.)
2. Jamaica.
3. Santa Lucia.
4. Trinidad.
5. Domingo.
6. Porto Rico.
7. Martinique.
8. Guadelupe.
9. Dominica.
10. Granada.

11. Costa Rica.

12. Guatemala, Nicaragua, Salvador.

VIII. South American Coffee.

1. Surinam.
2. Berbice, Demerara.
3. Venezuela, La Guayra, Caracas.
4. Puerto Cabello, or Coast Porto Rico.
5. Brazil.

Coffee owes its stimulating properties to an alkaloid caffeine which occurs in the beans as well as in other parts of the plant. Caffeine also occurs in other plants; it is the active principle in Guarana and is perhaps identical with theine, the active principle of tea. It is generally believed that moderate coffee-drinking is beneficial rather than otherwise. It has ever been the favorite drink of those actively engaged in intellectual work. It has been tested and found satisfactory as a stimulant for soldiers on long or forced marches. Injurious effects are due to excessively strong coffee, or a long-continued use of coffee which has been standing for some time and which contains considerable tannin. Caffeine has been found very useful in hemicrania and various nervous affections. It has also been recommended in dropsy due to heart lesion. Strong, black coffee is very valuable in counteracting poisoning by opium and its derivatives. Coffee will also check vomiting. Strong coffee is apt to develop various nervous troubles, as palpitation of the heart, sleeplessness, indigestion, trembling. According to one authority, it is the aromatic principle of coffee which causes sleeplessness.

DESCRIPTION OF PLATE.

A, twig with flowers and immature fruit, about natural size; 1, Corolla; 2, Stamens; 3, Style and stigma (pistil); 4, Ovary in longitudinal section; 5 and 6, Coffee bean in dorsal and ventral view; 7, Fruit in longitudinal section; 8, Bean in transverse section; 9, Bean sectioned to show caulicle; 10, Caulicle.

THE TWO ACORNS.

DR. CHARLES MACKAY.

In ancient time, two acorns, in their
cups,
Shaken by winds and ripeness from the
tree,
Dropped side by side into the ferns and
grass;
"Where have I fallen—to what base re-
gion come?"
Exclaimed the one. "The joyous breeze
no more
Rocks me to slumber on the sheltering
bough;
The sunlight streams no longer on my
face;
I look no more from altitudes serene
Upon the world reposing far below—
Its plains, its hills, its rivers, and its
woods.
To me the nightingale sings hymns no
more;
But I am made companion of the worm,
And rot on the chill earth. Around
me grow
Nothing but useless weeds, and grass,
and fern,
Unfit to hold companionship with me.
Ah, me! most wretched! rain and frost
and dew
And all the pangs and penalties of
earth
Corrupt me where I lie—degenerate."
And thus the acorn made its daily moan.
The other raised no murmur of com-
plaint
And looked with no contempt upon the
grass
Nor called the branching fern a worth-
less weed
Nor scorned the woodland flowers that
round it blew.

All silently and piously it lay
Upon the kindly bosom of the earth.
It blessed the warmth with which the
noonday sun
Made fruitful all the ground; it loved
the dews,
The moonlight and the snow, the frost
and rain
And all the change of seasons as they
passed.
It sank into the bosom of the soil.
The bursting life, enclosed within its
husk,
Broke through its fetters; it extended
roots
And twined them freely in the grateful
ground;
It sprouted up and looked upon the
light;
The sunshine fed it; the embracing air
Endowed it with vitality and strength;
The rains of heaven supplied it nour-
ishment.
And so from month to month, and year
to year,
It grew in beauty and in usefulness,
Until its large circumference enclosed
Shelter for flocks and herds; until its
boughs
Afforded homes for happy multitudes—
The dormouse and the chaffinch and
the jay
And countless myriads of minuter life;
Until its bole, too vast for the embrace
Of human arms, stood, in the forest
depths,
The model and glory of the wood.
Its sister acorn perished in its pride.

A DEFENSE OF SOME BIRDS.

ABBIE C. STRONG.

To the Editor of Birds and All Nature:

IN THE October number of BIRDS AND ALL NATURE was an article containing a list of the enemies of song birds and ordering their banishment, if one would enjoy the presence of the little songsters. Included in the list were the blue jays. There was also an article entitled, "A new Champion for the English Sparrow."

I always rejoice when someone comes forward in defense of the despised class, finding them not wholly faulty. The same hand created all, and surely each must be of some use. I feel like saying something in favor of the blue jay. I am sure that all will acknowledge that the jay has a handsome form and rare and beautiful plumage, which at least makes him "a thing of beauty;" he may not be "a joy forever," but surely a delight to the eye. Formerly my home was in northern Iowa, living many years in one place in a town of about 6,000 inhabitants. Our lawn was spacious for a town, filled with shrubbery and trees, both evergreen and deciduous. We did not encourage cats, usually keeping dishes of water here and there for the accommodation of the birds, and other attractions which they seemed to appreciate, as numerous migratory birds came each season, taking up their abode with us, to their evident enjoyment and giving us much pleasure. The jays were always with us, were petted and as they became friendly and tame, naturally we were much attached to them. The limb of a tree growing very close to a back veranda had been sawed off and a board nailed on the top forming a table, where we daily laid crumbs and a number of jays as regularly came after them. They were fond of meat and almost anything from the table. I found the jay to be a provident bird; after satisfying his appetite he safely buried the remainder of his food. I often noticed them concealing acorns and other nuts in hollow places in the trees, and noticed also that they

were left till a stormy day which prevented them from finding food elsewhere as usual. I saw one bury a bit of meat under leaves near a dead flower twig; there came a rather deep fall of snow that night, but the bird managed to find it the next day with little difficulty and flew off with a cry of delight. The jay nested on the grounds, but that did not seem to prevent other birds from coming in great numbers and variety and making their little homes there also. I recall one year which was but a repetition of most of the years. The jays had a nest in a crab apple tree, a cat bird nested in a vine close to the house, a robin came familiarly to one of the veranda pillars in front of the house and built her solid nest of mud and grass. A brown thrush took a dense spruce for her nesting-place. A blackbird, to my surprise, built a nest in a fir tree. A grosbeak built a nest on a swaying branch of a willow at the back of the lot, and a bluebird occupied a little house we had put in a walnut tree for her convenience.

The orioles were always in evidence, usually making their appearance in early May when the fruit trees were in bloom; first seen busily looking the trees over for insects. Generally they selected an outreaching branch of a cottonwood tree, often near where they could be watched from a veranda, building their graceful nests and caring for their little ones. The chattering little wrens never questioned our friendliness, but always built loose little nests quite within our reach, either in a box we provided for them or over the door; at the same time others had their little homes in cozy places in the barn, or in the loose bark of an old tree. Each bird attended to its own affairs without perceptible molestation from others, as a rule. It was evident, however, that the jays were not tolerated in company with other birds to any great extent, and I fancy they had a rather bad reputation, for I noticed the birds took a defensive position often when a jay

made its appearance near their homes without any apparent evil intent, that I could discover. I would sometimes see as many as five varieties of birds after one jay; they were always victors, too. The robin, I always observed, could defend himself against a jay, never seemed afraid to do so, and indeed seemed to be the aggressor. The blue jay may be a sly bird, a "robber and a thief," though I never detected those traits to any especial extent; but he is handsome and brightens the winter landscape. To be sure, I found that he was fond of green peas and corn and did not hesitate in helping himself, also sampling the bright Duchess apples. The robin is equally fond of all small fruits, and greedy as well.

The bluebirds came regularly in the early spring for years, then ceased apparently when the sparrows made their appearance. The sparrows made many attempts to usurp the little house provided especially for the bluebird, but were not allowed to do so and never gained a footing on the premises; still the little spring harbinger ever after kept aloof from us. In the winter season the English sparrow came occasion-

ally to share the bluejays' tidbits, but was promptly repulsed, although other birds came freely. The dainty little snowbird, several kinds of woodpeckers, now and then a chickadee, and some other winter birds came also. I had ways of enticing the birds to come near where I could watch their habits and peculiarities. All birds fear cats. There are cats and cats—some never molest birds or little chickens, but, as a rule, they seem to be their natural enemies. Little boys, I am sorry to say, cause great destruction of birds, often thoughtlessly, by trying their marksmanship. I would banish every "sling shot!" It is even worse than taking eggs, for they are generally replaced; but when the mother-bird is taken a little brood is left helpless to suffer and die. Thoughtful kindness towards little birds should be encouraged among children. I would have one day each year devoted to the subject in all public schools. It would bring birds under the observation of many who otherwise would pass them by unnoticed, and when one takes an interest in anything, be it flowers or birds, he or she is less likely to cause their destruction.

MARCH AND MAY.

"The brown, brown woods of March
Are the green, green woods of May,
And they lift their arms with a freer swing
And shake out their pennons gay.
And the brown, dead world of March
Is the living world of to-day;
Life throbs and flushes and flashes out
In the color and fragrance of May."



Painted by
V. V.

BONAPARTE'S GULL.

(*Larus Philadelphia.*)

LYNDS JONES.

THE whole of North America is the home of this pretty little gull—from the Bermudas to Labrador on the east, California to the Yukon on the west, and from the Gulf of Mexico at least to the Arctic circle. This species is often common near streams and other bodies of water large enough to furnish their food of fish. I have often seen flocks of twenty or more birds passing over central Iowa during the vernal migrations, sometimes even stooping to snatch some toothsome grub from the freshly turned furrow, but oftener sweeping past within easy range in that lithe, graceful flight so characteristic of this small gull. To the farm boy, shut in away from any body of water larger than an ice pond, where no ocean birds could ever be expected to wander, the appearance of this bird, bearing the wild freedom of the ocean in his every movement, is truly a revelation. It sends the blood coursing hotly through his veins until the impulse to get away into the broader activities of life cannot be put down. I know not why it is, but some birds, seen for the first time, seem to waft the perfume of an unknown country to us, well-nigh irresistibly calling us away upon a new field of exploration or endeavor.

The flight of Bonaparte's gull is worthy of careful study. In common with the other members of the group of gulls, he progresses easily by continuous leisurely wing beats, each stroke of the wings seeming to throw the light body slightly upward as though it were not more than a feather's weight. In the leisurely flight the watchful eye is turned hither and thither in quest of some food morsel, which may be some luckless fish venturing too near the surface of the water, or possibly floating refuse. The flight is sometimes so suddenly arrested that the body of the bird seems to be thrown backward before the

plunge is made, thus giving the impression of a graceful litheness which is not seen in the larger birds of this group.

It is only in the breeding-plumage that this species wears the slaty plumbeous hood. In the winter the hood is wanting, though it may be suggested by a few dark spots, but there is a dusky spot over the ears always. It seems doubtful if the birds attain the dark hood until the second or third year, at which time they may be said to be fully adult.

It was formerly supposed that this gull nested entirely north of the United States, but later investigations have shown that it nests regularly in northern Minnesota and even as far south as the Saint Clair Flats near Detroit, Mich. It may then be said to nest from the northern United States northward to the limit of its range. It is rare along the Alaskan coast of Bering sea, and there seems to be no record of it along the coast of the Arctic ocean.

The nest is always placed in elevated situations, in bushes, trees, or on high stumps, and is composed of sticks, grasses, and lined with softer vegetable material. The eggs are three or four in number and have the grayish-brown to greenish-brown color, spotted and blotched with browns, which is characteristic of the gulls as a group.

While the gulls are fish-eaters and almost constantly hover above the fishers' nets, often catching over again the fish which the nets have trapped, we never hear of any warfare waged against them by the fishermen. On the contrary, the gulls are always on the most friendly terms with them, gladly accepting the fish found unworthy of the market. But let a bird of whatever kind visit the orchard or chicken-yard, for whatever purpose, and his life is not worth a moment's consideration. We need again to sit at the feet of fishermen as earnest inquirers.

EGG COLLECTING.

FRED MAY,
School Taxidermist.

To the Editor of Birds and All Nature:

I AM glad the magazine of birds is furnishing its readers so many points about the good qualities of our birds. And as they are being protected more every year by the state laws and by the lovers of birds, I think they are sure to increase. I have often been asked about the decrease in bird life. The blame is generally put on the taxidermist, collector, sportsman, and schoolboy, which I claim is all wrong. The taxidermist collector of to-day is a lover of bird-life, and only hunts specimens to mount for a scientific purpose. This gives our school children a better chance to study them. The schoolboy and girl of to-day are doing great good in the protection of bird-life, and your book of birds has a warm friend among them. The true sportsman always lives up to the laws and takes a fair chance with dog and gun. The plume and bird collector will soon be a thing of the past, as hats trimmed with choice ribbons and jets are fast taking the place of those covered with feathers and birds. Now the persons who hide behind all these, and who destroy more bird-life in a single season than all the hunters and collectors of skins, are never brought to the eyes of the press. These are the people who have a rod for egg-collecting. They not only rob the nest of its one setting, but will take the eggs as long as the bird will continue to lay, and, not satisfied with that, will take the eggs from every bird as long as they can find them. They will even take the eggs after incubation has begun, and oftentimes, after a hard climb for the eggs, will destroy the nest. There are thousands upon thousands of settings of eggs of every kind taken every year by these fad egg collectors and you will see in some of our magazines on ornithology offers of from fifty to five hundred settings for sale. Now, what is an egg to this egg collector? Nothing. But to the lover of birds there is a

great deal in that shell. There is a life; the song of the woods and of the home. In that shell is the true and faithful worker who has saved our farmers and our city homes and parks from the plagues of insects that would have destroyed crops and the beauty of our homes. Shall the law allow these nest-robbers to go on summer after summer taking hundreds of thousands of settings? If it shall I am afraid the increase in our bird-life will be slow. With the help of our game wardens and sporting-clubs a great deal of this could be stopped, and a great saving could be made in game birds' eggs. Our country school children can protect our song birds' nests by driving these collectors, with their climbing irons and collecting cans, from their farms in the breeding-season. Yes, it often looks sad to see a song bird drop at the report of the gun of the skin collector. But when we think of the bird-egg collector sneaking like a thief in the night up a tree or through a hedge, taking a setting of eggs on every side while the frightened mother sits high in the tree above, and then down and off in search of more, only to come back in a short time to take her eggs again—what is bird-life to him? What would he care to be sitting in the shade by the lake or stream listening to the song of the robin, or after a hard day's work in the hot summer, be seated on his porch to hear the evening song of the warbler and the distant call of the whippoorwill? Let the lovers of bird-life commence with the spring song, with the building of the nest, and save each little life they can from the egg collector. Will this man, if he may be called a man, look into his long drawers filled with eggs, and his extra settings for sale and trade? Let him think of the life he has taken, the homes he has made unhappy. I should think he would go like Macbeth from his sleep to wash the blood from his hands.

THE BABOON.

NATURALISTS seem to be agreed that the baboons (*cynocephalus*), while one of the most remarkable groups of the monkey family, are the ugliest, rudest, coarsest, and most repulsive representatives of it. The animal stands in the lowest degree of development of the monkey tribe, and possesses none of the nobler shapes and qualities of mind of other species. Aristotle called the baboons dog-headed monkeys, on account of the shape of their heads, which have a resemblance to that of a rude, fierce dog.

The baboons are found throughout Africa, Arabia, and India. In the main they are mountain monkeys, but also live in forests and are excellent tree-climbers. In the mountains they go as high as nine thousand to thirteen thousand feet above the sea-level, but give preference to countries having an elevation of three thousand or four thousand feet. Old travelers assert that mountainous regions are their true home.

The food of the baboons consists chiefly of onions, tubers, grass, fruit, eggs, and insects of all kinds, but, as they have also a greedy appetite for animal food, they steal chickens and kill small antelopes. In plantations, and especially vineyards, they cause the greatest damage, and are even said to make their raids in an orderly, deliberate, and nearly military manner.

Brehm, who observed them closely, says that they resemble awkward dogs in their gait, and even when they do stand erect they like to lean on one hand. When not hurried their walk is slow and lumbering; as soon as they are pursued, they fall into a singular sort of gallop, which includes the most peculiar movements of the body.

The moral traits of the baboons are quite in accord with their external appearance. Scheitlin describes them as all more or less bad fellows, "always savage, fierce, impudent, and malicious; the muzzle is a coarse imitation of a dog's, the face a distortion of a dog's face. The look is cunning, the mind wicked. They are more open to in-

struction than the smaller monkeys and have more common sense. Their imitative nature seems such that they barely escape being human. They easily perceive traps and dangers, and defend themselves with courage and bravery. As bad as they may be, they still are capable of being tamed in youth, but when they become old their gentle nature disappears, and they become disobedient; they grin, scratch, and bite. Education does not go deep enough with them. It is said that in the wild state they are more clever; while in captivity they are gentler. Their family name is 'dog-headed monkeys.' If they only had the dog's soul along with his head!" Another traveler says that they have a few excellent qualities; they are very fond of each other and their children; they also become attached to their keeper and make themselves useful to him. "But these good qualities are in no way sufficient to counterbalance their bad habits and passions. Cunning and malice are common traits of all baboons, and a blind rage is their chief characteristic. A single word, a mocking smile, even a cross look, will sometimes throw the baboon into a rage, in which he loses all self-control." Therefore the animal is always dangerous and never to be trifled with.

The baboons shun man. Their chief enemy is the leopard, though it oftener attacks the little ones, as the old fellows are formidable in self-defense. Scorpions they do not fear, as they break off their poisonous tails with great skill, and they are said to enjoy eating these animals as much as they do insects or spiders. They avoid poisonous snakes with great caution.

This animal is said to be remarkable for its ability in discovering water. In South Africa, when the water begins to run short, and the known fountains have failed, it is deprived of water for a whole day, until it is furious with thirst. A long rope is then tied to its collar, and it is suffered to run about where it chooses. First it runs forward a little, then stops, gets on its hind feet,

and sniffs the air, especially noting the wind and its direction. It will then, perhaps, change its course, and after running for some distance take another observation. Presently it will spy out a blade of grass, pluck it up, turn it on all sides, smell it, and then go forward again. Thus the animal proceeds until it leads the party to water. In this respect at least, baboons have their uses, and on occasions have been the benefactors of man.

The baboons have, in common with the natives, a great fondness for a kind of liquor manufactured from the grain of the *durra* or *dohen*. They often become intoxicated and thus become easy of capture. They have been known to drink wine, but could not be induced to taste whisky. When they become completely drunk they make the most fearful faces, are boisterous and brutal, and present altogether a degrading caricature of some men.

As illustrating the characteristics of fear and curiosity in the baboon, we will quote the following from the personal experience of Dr. Brehm, the celebrated traveler. He had a great many pets, among others a tame lioness, who made the guenons rather nervous, but did not strike terror to the hearts

of the courageous baboons. They used to flee at her approach, but when she really seemed to be about to attack one of them, they stood their ground fairly well. He often observed them as they acted in this way. His baboons turned to flee before the dogs, which he would set upon them, but if a dog chanced to grab a baboon, the latter would turn round and courageously rout the former. The monkey would bite, scratch, and slap the dog's face so energetically that the whipped brute would take to his heels with a howl. More ludicrous still seemed the terror of the baboons of everything creeping, and of frogs. The sight of an innocent lizard or a harmless little frog would bring them to despair, and they would climb as high as their ropes would permit, clinging to walls and posts in a regular fit of fright. At the same time their curiosity was such that they had to take a closer look at the objects of their alarm. Several times he brought them poisonous snakes in tin boxes. They knew perfectly well how dangerous the inmates of these boxes were, but could not resist the temptation of opening them, and then seemed fairly to revel in their own trepidation.

THE SUMMER POOL.

BUCHANAN.

There is a singing in the summer air,
The blue and brown moths flutter o'er the grass,
The stubble bird is creaking in the wheat,
And, perched upon the honeysuckle hedge,
Pipes the green linnet. Oh! the golden world—
The star of life on every blade of grass,
The motion and joy on every bough,
The glad feast everywhere, for things that love
The sunshine, and for things that love the shade.

THE FEATHER CRUSADE.

E. K. M.

JUST as the Audubon societies and the appeals of humanitarians in general have had some effect in lessening the demand for the aigrette for millinery purposes, and their banishment, as officially announced, from the helmets of the British army, there springs up a new fashion which, if generally adopted, will prove very discouraging—especially to the birds.

"She made a decided sensation last evening at the opera," says Miss Vanity's fond mamma. "Those blackbirds with outspread wings at either side of her head were simply fetching. They drew every lorgnette and every eye in the house upon her. Not a woman of fashion, or otherwise, I venture to say, will appear at a public function hereafter without a pair of stuffed birds in her hair."

A melancholy outlook truly, though as an onlooker expressed it, the effect of the spreading wings was vastly more grotesque than beautiful. The poor little blackbirds! Their destruction goes on without abatement.

"I like the hat," said a gentle-looking little lady in a fashionable millinery establishment the other day, "but," removing it from her head, "those blackbirds must be removed and flowers put in their place."

"A member of the Audubon Society, probably," queried the attendant, respectfully.

"No," was the answer, "but for years the birds have been welcome visitors at our country place, great flocks of blackbirds, especially, making their homes in our trees. This year, and indeed the last, but few appeared, and we have in consequence no love for the hunters and little respect for the women who, for vanity's sake, make their slaughter one of commercial necessity and greed."

'Tis said fashion is proof against the appeals of common sense or morality, and one must accept the statement as true when, in spite of all that has been said upon the subject, the Paris journals announce that "birds are to be worn

more than ever and blouses made entirely of feathers are coming into fashion." The use of bird skins in Paris for one week represent the destruction of one million three hundred thousand birds; in London the daily importation ranges from three hundred to four hundred thousand. It is honestly asserted that, in the height of the season, fifty thousand bird skins are received in New York City daily.

At the annual meeting of the Audubon Society of New York state a letter was read from Governor Roosevelt in which he said that he fully sympathized with the purpose of the society and that he could not understand how any man or woman could fail to exert all influence in support of its object.

"When I hear of the destruction of a species," he added, "I feel just as if all the works of some great writer had perished; as if one had lost all instead of only a part of Polybius or Livy."

Rev. Dr. Henry Van Dyke sent a letter in which he said the sight of an aigrette filled him with a feeling of indignation, and that the skin of a dead songbird stuck on the head of a tuneless woman made him hate the barbarism which lingers in our so-called civilization. Mr. Frank M. Chapman, at the same meeting, stated that the widespread use of the quills of the brown pelican for hat trimming was fast bringing about the extinction of that species.

In front of my pew sits a maiden—

A little brown wing in her hat,
With its touches of tropical azure,
And the sheen of the sun upon that.

Through the bloom-colored pane shines a
glory

By which the vast shadows are stirred,
But I pine for the spirit and splendor
That painted the wing of that bird.

The organ rolls down its great anthem,
With the soul of a song it is blent,
But for me, I am sick for the singing
Of one little song that is spent.

The voice of the curate is gentle:

"No sparrow shall fall to the ground;"
But the poor broken wing on the bonnet
Is mocking the merciful sound.

GOD'S SILENCE AND HIS VOICES ALSO.

DR. N. D. HILLIS.

NATURE loves silence and mystery. Reticent, she keeps her own counsel. Unlike man, she never wears her heart upon her sleeve. The clouds that wrap the mountain about with mystery interpret nature's tendency to veil her face and hold off all intruders. By force and ingenuity alone does man part the veil or pull back the heavy curtains. The weight of honors heaped upon him who deciphers her secret writings on the rock or turns some poison into balm and medicine, or makes a copper thread to be a bridge for speech, proclaims how difficult it is to solve one of nature's simplest secrets. For ages man shivered with cold, but nature concealed the anthracite under thick layers of soil. For ages man burned with fever, but nature secreted the balm under the bark of the tree. For ages, unaided, man bore his heavy burdens, yet nature veiled the force of steam and concealed the fact that both wind and river were going man's way and might bear his burdens.

Though centuries have passed, nature is so reticent that man is still uncertain whether a diet of grain or a diet of flesh makes the ruddier countenance. Also it is a matter of doubt whether some young Lincoln can best be educated in the university of rail-splitting or in a modern college and library; whether poverty or wealth does the more to foster the poetic spirit of Burns or the philosophic temper of Bach. In the beautiful temple of Jerusalem there was an outer wall, an inner court, "a holy place," and afar-hidden within, "a place most holy." Thus nature conceals her secrets behind high walls and doors, and God also hath made thick the clouds that surround the divine throne.

CONCEALMENTS OF NATURE.

Marvelous, indeed, the skill with which nature conceals secrets number-

less and great in caskets small and mean. She hides a habitable world in a swirling fire-mist. A magician, she hides a charter oak and acre-covering boughs within an acorn's shell. She takes a lump of mud to hold the outlines of a beautiful vase. Beneath the flesh-bands of a little babe she secretes the strength of a giant, the wisdom of a sage and seer. A glorious statue slumbers in every block of marble; divine eloquence sleeps in every pair of human lips; lustrous beauty is for every brush and canvas; unseen tools and forces are all about inventors, but they who wrest these secrets from nature must "work like slaves, fight like gladiators, die like martyrs."

For nature dwells behind adamant walls, and the inventor must capture the fortress with naked fists. In the physical realm burglars laugh at bolts and bars behind which merchants hide their gold and gems. Yet it took Ptolemy and Newton 2,000 years to pick the lock of the casket in which was hidden the secret of the law of gravity. Four centuries ago, skirting the edge of this new continent, neither Columbus nor Cabot knew what vast stretches of valley, plain, and mountain lay beyond the horizon.

If once a continent was the terra incognita, now, under the microscope, a drop of water takes on the dimensions of a world, with horizons beyond which man's intellect may not pass. Exploring the raindrop with his magnifying-glass, the scientist marvels at the myriad beings moving through the watery world. For the teardrop on the cheek of the child, not less than the star riding through God's sky, is surrounded with mystery, and has its unexplored remainder. Expecting openness from nature, man finds clouds and concealment. He hears a whisper where he listens for the full thunder of God's voice to roll along the horizon of time.

THE OWLS' SANCTUARY.

PROF. HENRY C. MERCER.

S EVEN bluish-white, almost spherical eggs, resting on the plaster floor of the court-house garret, at Doylestown, Pennsylvania, caught the eye of the janitor, Mr. Bigell, as one day last August he had entered the dark region by way of a wooden wicket from the tower. Because the court-house pigeons, whose nestlings he then hunted, had made the garret a breeding-place for years, he fancied he had found another nest of his domestic birds. But the eggs were too large, and their excessive number puzzled him, until some weeks later, visiting the place again (probably on the morning of September 20), he found that all the eggs save one had hatched into owlets, not pigeons.

The curious hissing creatures, two of which seemed to have had a week's start in growth, while one almost featherless appeared freshly hatched, sat huddled together where the eggs had lain, close against the north wall and by the side of one of the cornice loop-holes left by the architect for ventilating the garret. Round about the young birds were scattered a dozen or more carcasses of mice (possibly a mole or two), some of them freshly killed, and it was this fact that first suggested to Mr. Bigell the thought of the destruction of his pigeons by the parent owls, who had thus established themselves in the midst of the latter's colony. But no squab was ever missed from the neighboring nests, and no sign of the death of any of the other feathered tenants of the garret at any time rewarded a search.

As the janitor stood looking at the nestlings for the first time, a very large parent bird came in the loophole, fluttered near him and went out, to return and again fly away, leaving him to wonder at the staring, brown-eyed, monkey-faced creatures before him. Mr. Bigell had thus found the rare nest of the barn owl, *Strix pratincola*, a habitation which Alexander Wilson, the celebrated ornithologist, had never dis-

covered, and which had eluded the search of the author of "Birds of Pennsylvania." One of the most interesting of American owls, and of all, perhaps, the farmer's best friend, had established its home and ventured to rear its young, this time not in some deserted barn of Nockamixon swamp, or ancient hollow tree of Haycock mountain, but in the garret of the most public building of Doylestown, in the midst of the county's capital itself. When the janitor had left the place and told the news to his friends, the dark garret soon became a resort for the curious, and two interesting facts in connection with the coming of the barn owls were manifest; first, that the birds, which by nature nest in March, were here nesting entirely out of season—strange to say, about five months behind time; from which it might be inferred that the owls' previous nests of the year had been destroyed, and their love-making broken up in the usual way; the way, for instance, illustrated by the act of any one of a dozen well remembered boys who, like the writer, had "collected eggs;" by the habitude of any one of a list of present friends whose interest in animals has not gone beyond the desire to possess them in perpetual captivity and watch their sad existence through the bars of a cage; or by the "science" of any one of several scientific colleagues who, hunting specimens for the sake of a show-case, "take" the female to investigate its stomach.

Beyond the extraordinary nesting date, it had been originally noticed that the mother of the owlets was not alone, four or five other barn owls having first come to the court-house with her. Driven by no one knew what fate, the strange band had appeared to appeal, as if in a body, to the protection of man. They had placed themselves at his mercy as a bobolink when storm driven far from shore lights upon a ship's mast.

But it seemed, in the case of the owls,

no heart was touched. The human reception was that which I have known the snowy heron to receive, when, wandering from its southern home, it alights for awhile to cast its fair shadow upon the mirror of the Neshaminy, or such as that which, not many years ago, met the unfortunate deer which had escaped from a northern park to seek refuge in Bucks County woods. At first it trusted humanity; at last it fled in terror from the hue and cry of men in buggies and on horseback, of enemies with dogs and guns, who pursued it till strength failed and its blood dyed the grass.

So the guns of humanity were loaded for the owls. The birds were too strange, too interesting, too wonderful to live. The court house was no sanctuary. Late one August night one fell at a gun shot on the grass at the poplar trees. Then another on the pavement by the fountain. Another, driven from its fellows, pursued in mid air by two crows, perished of a shot wound by the steps of a farmhouse, whose acres it could have rid of field mice.

The word went out in Doylestown that the owls were a nuisance. But we visited them and studied their ways, cries, and food, to find that they were not a nuisance in their town sanctuary.

In twenty of the undigested pellets, characteristic of owls, left by them around the young birds, we found only the remains, as identified by Mr. S. N. Rhoads of the Academy of Natural Sciences of Philadelphia, of the bones, skulls, and hair of the field mouse (*Microtus pennsylvanicus*) and star nose mole (*Condylura cristata*). "They killed the pigeons," said someone, speaking without authority, after the manner of a gossip who takes away the character of a neighbor without proof. But they had not killed the pigeons. About twelve pairs of the latter, dwelling continually with their squabs in the garret, though they had not moved out of the particular alcove appropriated by the owls, had not been disturbed. What better proof could be asked that THE BARN OWL IS NOT A POULTRY DESTROYER?

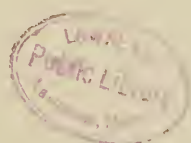
It was objected that the owls' cries kept citizens awake at night. But

when, one night last week, we heard one of their low, rattling cries, scarcely louder than the note of a katydid, and learned that the janitor had never heard the birds hoot, and that the purring and hissing of the feeding birds in the garret begins about sundown and ceases in the course of an hour, we could not believe that the sleep of any citizen ever is or has been so disturbed.

When I saw the three little white creatures yesterday in the court house garret, making their strange bows as the candle light dazzled them, hissing with a noise as of escaping steam, as their brown eyes glowed, seemingly through dark-rimmed, heart-shaped masks, and as they bravely darted towards me when I came too near, I learned that one of the young had disappeared and that but one of the parent birds is left, the mother, who will not desert her offspring.

On October 28 two young birds were taken from their relatives to live henceforth in captivity, and it may be that two members of the same persecuted band turned from the town and flew away to build the much-talked-of nest in a hollow apple tree at Mechanics' Valley. If so, there again the untaught boy, agent of the mother that never thought, the Sunday school that never taught, and the minister of the Gospel that never spoke, was the relentless enemy of the rare, beautiful, and harmless birds. If he failed to shoot the parents, he climbed the tree and caught the young.

If the hostility to the owls of the court house were to stop, if the caged birds were to be put back with their relatives, if the nocturnal gunners were to relent, would the remaining birds continue to add an interest to the public buildings by remaining there for the future as the guests of the town? Would the citizens of Doylestown, by degrees, become interested in the pathetic fact of the birds' presence, and grow proud of their remarkable choice of sanctuary, as Dutch towns are proud of their storks? To us, the answer to these questions, with its hope of enlightenment, seems to lie in the hands of the mothers, of the teachers of Sunday schools, and of the ministers.





THE WATER THRUSH.

C. C. MARBLE.

I never see a skylark fly
Straight upward, singing, to the sky,
Or hear the bobolink's glad note
Issue with frenzy from his throat,
As though his very heart would break
In bars of music, but straight
I think, brave, happy bridegrooms they,
And this must be their wedding-day.

C. C. M.

THE water thrush (*Seiurus noveboracensis*) has so many popular names that it will be recognized by most observers by one or more of them. It is called small-billed water-thrush, water wagtail, water kick-up, Besoy kick-up, and river pink (*Jamaica*), aquatic accentor, and New York aquatic thrush. It is found chiefly east of the Mississippi River, north to the Arctic coast, breeding from the north border of the United States northward. It winters in more southern United States, all of middle America, northern South America, and all of West Indies. It is accidental in Greenland. In Illinois this species is known as a migrant, passing slowly through in spring and fall, though in the extreme southern portion a few pass the winter, especially if the season be mild. It frequents swampy woods and open, wet places, nesting on the ground or in the roots of overturned trees at the borders of swamps. Mr. M. K. Barnum of Syracuse, New York,

found a nest of this species in the roots of a tree at the edge of a swamp on the 30th of May. It was well concealed by the overhanging roots, and the cavity was nearly filled with moss, leaves, and fine rootlets. The nest at this date contained three young and one egg. Two sets were taken, one near Listowel, Ontario, from a nest under a stump in a swamp, on June 7, 1888; the other from New Canada, Nova Scotia, July 30, 1886. The nest was built in moss on the side of a fallen tree. The eggs are creamy-white, speckled and spotted, most heavily at the larger ends, with hazel and lilac and cinnamon-rufous.

As a singer this little wagtail is not easily matched, though as it is shy and careful to keep as far from danger as possible, the opportunity to hear it sing is not often afforded one. Though it makes its home near the water, it is sometimes seen at a considerable distance from it among the evergreen trees.

THE TARSIER.

A LONG with Tagals, Ygorottes, and other queer human beings Uncle Sam has annexed in the Philippine islands, says the Chronicle, is the tarsier, an animal which is now declared to be the grandfather of man.

They say the tarsier is the ancestor of the common monkey, which is the ancestor of the anthropoid ape, which some claim as the ancestor of man.

A real tarsier will soon make his appearance at the national zoological park. His arrival is awaited with intense interest.

Monsieur Tarsier is a very gifted animal. He derives his name from the enormous development of the tarsus, or ankle bones of his legs. His eyes are enormous, so that he can see in the dark. They even cause him to be called a ghost. His fingers and toes are provided with large pads, which enable him to hold on to almost anything.

Professor Hubrecht of the University of Utrecht has lately announced that Monsieur Tarsier is no less a personage than a "link" connecting Grandfather Monkey with his ancestors. Thus the scale of the evolution theorists would be changed by Professor Hubrecht to run: Man, ape, monkey, tarsier, and so on, tarsier appearing as the great-grandfather of mankind.

Tarsier may best be described as having a face like an owl and a body, limbs, and tail like those of a monkey. His sitting height is about that of a squirrel. As his enormous optics would lead one to suppose, he cuts capers in the night and sleeps in the daytime, concealed usually in abandoned clearings, where new growth has sprung up to a height of twenty feet or more. Very often he sleeps in a standing posture, grasping the lower stem of a small tree with his long and slender fingers and toes. During his nightly wanderings he utters a squeak

like that of a monkey. During the day the pupils of his eyes contract to fine lines, but after dark expand until they fill most of the irises. From his habit of feeding only upon insects he has a strong, bat-like odor.

John Whitehead, who has spent the last three years studying the animals of the Philippines, foreshadows the probable behavior of the tarsier when he arrives at the national "zoo." The Philippine natives call the little creature "magou."

"In Samar," says Mr. Whitehead, in a report just received at the Smithsonian, "where at different times I kept several tarsiers alive, I found them very docile and easily managed during the day. They feed freely off grasshoppers, sitting on their haunches on my hand. When offered an insect the tarsier would stare for a short time with its most wonderful eyes, then slowly bend forward, and, with a sudden dash, would seize the insect with both hands and instantly carry it to its mouth, shutting its eyes and screwing up its tiny face in a most whimsical fashion. The grasshopper was then quickly passed through the sharp little teeth, the kicking legs being held with both hands.

"When the insect was beyond further mischief the large eyes of the tarsier would open and the legs and wings were then bitten off, while the rest of the body was thoroughly masticated. My captive would also drink fresh milk from a spoon. After the sun had set this little animal became most difficult to manage, escaping when possible and making tremendous jumps from chair to chair. When on the floor it bounded about like a miniature kangaroo, traveling about the room on its hind legs with the tail stretched out and curved upward, uttering peculiar, shrill, monkeylike squeaks and biting quite viciously when the opportunity offered."

THE TRAILING ARBUTUS.

WILLIAM K. HIGLEY.

Thou dainty firstling of the spring,
Homage due to thee, I bring.

The faintest blushes of the morn
Do tint thy petals and adorn,

And thy fine perfume, sweetly faint,
Is like the breathings of a saint.

Oh my sweet! how fair thou art;
How chaste and pure thy dewy heart!

Thou poem of perfumed grace,
Dear hope and truth beam from thy face.

I drink deep draughts of joyfulness,
And bow before thy loveliness.

—Albert C. Pearson.

THE great heath family (*Ericinæ*) are scattered over many parts of the world, and include a great variety of plants, many like the American laurel (*Kalmia*) being large shrubs or small trees. Others are much smaller, and among the smallest plants, there is none more beautiful and universally loved than the charming trailing arbutus (*Epigæa repens*).

Those who are fortunate enough to live in the localities where it is found have the rare pleasure of searching for the early blossoms, which prefer to nestle cosily at the foot of the evergreen trees, though they are sometimes found in the open.

The late snows may even cover the blooms, but when their delicate heads are peering through, we know that winter has fled, and that the snow mantle is only a cast-off garment which, too, will slip away, dissolved by the long rays of the early spring sunshine.

In New England the trailing arbutus is called May flower, and in other places is known as the ground laurel. Its scientific name (*Epigæa repens*) is from two Greek words, *epigæa*, meaning "upon the earth," and *repens*, "trailing, or creeping."

The word arbutus is from the Latin, meaning a tree, and is first applied to another tribe of the same family, and is pronounced with the accent on the first syllable—arbutus. This must not be confounded with the trailing arbutus, where usage allows the accent on the second syllable—arbutus (*Standard Dictionary*) and whose characteristics are very different.

The trailing arbutus is a native of the eastern portion of North America, but is found as far west as Wisconsin. It grows among the rocks, or in a sandy soil, as in Michigan, and it blossoms

from March until May, though April is its chosen month.

The flowers are sometimes pure white though usually beautifully tinged with various shades of pink and red, and though really forming terminal clusters, they are apparently clustered in the axils of the evergreen and leathery leaves.

The leaves may be oval or orbicular, and the stems which are tough and hairy grow to the length of six to fifteen inches.

The fragrance of the flower is very strong and attractive, though its strength varies with its locality and with the character of the soil in which it grows, and it is especially fine when growing under evergreen trees.

The stamens of the flower are interesting to the botanist as they vary greatly, apparently to insure cross-fertilization.

A study of this species, as well as of plant-life in general, teaches us that nature abhors self-fertilization and, as a rule, so develops plants that two individuals of the same species are essential to the production of seed.

This species especially enjoys nature, and is not easily cultivated. A few florists have succeeded in producing mature plants with fair results, but it may be stated that even transplanting, with much soil attached to the roots, to a soil identical with the native, results in a weakened development.

The trailing arbutus is greatly loved by the poet and writer, and has received many tributes from gifted pens.

Donald G. Mitchell, in speaking of the desolation of earliest spring, tells us that "the faint blush of the arbutus, in the midst of the bleak March atmosphere will touch the heart like a hope of heaven, in a field of graves."

THE HAIRY-TAILED MOLE.

IN THE March number of BIRDS AND ALL NATURE the common American mole, which is the most common species in the eastern portion of the United States, is described, and the habits of moles, which are identical, were rather fully set forth. The hairy-tailed mole (*Scapanus breweri*) is found principally in the western part of the United States.

This little animal has so many enemies besides man, as polecats, owls, ravens, storks, and the like, who watch it as it throws up its hillocks, that it is a wonder it has not been exterminated. It betrays its home by its own handiwork, as it is obliged constantly to construct new hillocks in order to earn its living. These hillocks always indicate the direction and extent of its hunting-grounds. The little weasels pursue it in its conduits, where it also frequently falls a prey to the adder. Only foxes, weasels, hedgehogs, and the birds already mentioned, eat it.

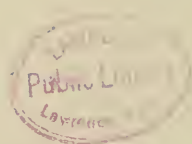
"Take the mole out of its proper sphere," says Wood, "and it is awkward and clumsy, but replace it in the familiar earth, and it becomes a different being—full of life and energy, and actuated by a fiery activity which seems quite inconsistent with its dull aspect and seemingly inert form. The absence of any external indication of eyes communicates a peculiar dullness to the creature's look, and the formation of the fore-limbs gives an indescribable awkwardness to its gait. In the ground only is it happy, for there only can it develop its various capabilities. No one can witness the eagerness with which it flings itself upon its prey, and the evident enjoyment with which it consumes its hapless victim without perceiving that the creature is exult-

antly happy in its own peculiar way. His whole life is one of fury, and he eats like a starving tiger, tearing and rending his prey with claws and teeth. A mole has been seen to fling itself upon a small bird, tear its body open, and devour it while still palpitating with life. 'Nothing short of this fiery energy could sustain an animal in the life-long task of forcing itself through the solid earth.'"

The hidden habitation of the mole is described as a nearly spherical chamber, the roof of which is nearly on a level with the earth around the hill, and therefore situated at a considerable depth from the apex of the heap. Around this are driven two circular galleries—one just level with the ceiling, and the other at some height above. The upper circle is much smaller than the lower. Five short, descending passages connect the galleries with each other, but the only entrance into the inner apartment is from the upper gallery, out of which three passages lead into the ceiling. It will be seen, therefore, that when a mole enters the house from one of its tunnels, it has first to get into the lower gallery, to ascend thence to the upper gallery, and so descend into its chamber. There is another entrance from below, however, by a passage which dips downward from the center of the chamber, and then, taking a curve upward, opens into one of the larger tunnels.

The mole comes from the earth with unsoiled fur, which is due in part to the peculiar character of the hair, and partly to strong membraneous muscles beneath the skin, by means of which the animal gives itself a frequent and powerful shake.





TREES.

W. E. WATT.

Woodman, spare that tree!
Touch not a single bough!
In youth it sheltered me,
And I'll protect it now.

—*Morris.*

The monarch oak, the patriarch of the trees,
Shoots rising up, and spreads by slow degrees;
Three centuries he grows, and three he stays
Supreme in state; and in three more decays.

—*Dryden.*

SUNLIGHT and moisture fall upon the earth and find it full of germs of life. At once growths begin each after its own kind. There is such a multitude of them that they have not yet been counted. Each locality has forms peculiar to itself. The places most abundantly watered have different forms from those less favored by rain and dew, and those receiving more heat and sun allow more luxuriant growths than others if the water supply is large.

The business of life and growth is mostly carried on by means of water set in motion and sustained by heat. Those forms of life which reach highest above the surface of the earth are called trees. They are always striving to see what heights they can attain. But the different forms of life have limits set them which they cannot pass. The structure of one tree is limited to carrying its top twenty feet from the ground, that of another is so favored that it can reach twice that height, and others tower high above us and stand for centuries.

But the same tree does not flourish with the same vigor in different places. The nourishment of the soil may favor it or poverty dwarf its growth. Moisture and heat must be supplied or the growth will be slight.

I have stood upon the thick tops of cedar trees on high places in the White mountains near the tree-line. Towards the summit the trees diminish in size until they become veritable dwarfs. They are stunted by the cold. They shrink aside or downward trying to find shelter from the angry winds that are so cutting. Diminutive tree trunks

are found that have curled themselves into sheltering crannies of rock and grown into such distorted shapes that they are gathered as curiosities.

The last trees to give up the fight on Mount Adams are the cedars of which I speak. They hug the rock for the little warmth that may be lurking there in remembrance of the sun's kindly rays; they mat themselves together and interlock their branches so as to form a springy covering to the whole ground. One may lie down upon their tops as upon a piece of upholstery, and in the openings below are rabbits and woodchucks and sometimes bears safely hidden from the view of the hunter.

From these ground-hugging trees of the mountain-tops to the great redwoods of our western slopes the mind passes the entire range of tree life. No trees are so great as our redwoods, though in Australia the eucalyptus reaches higher with a comparatively slender trunk. Where the forests are thickest, and the growth of the trees consequently tallest, the eucalyptus towers sometimes four or five hundred feet towards the sky.

The shrinking of mountain trees where the rock affords some warmth and shelter is shown on a larger scale in the forms of trees that stand at the edge of a forest. Where a stream divides the forest we find the trees upon the bank reaching out their branches and spreading luxuriant foliage over the water, because the open air in that direction helps the growth of leaves and twigs. Shade trees by the roadside reach out towards the open space of the road and grow one-sided because the conditions of light and air are bet-

ter over the road than against the buildings or other trees that are behind them.

The prevailing winds of any country bend the trees largely in one direction. In the vicinity of Chicago, where the return trade winds blow day after day from the southwest, we find the willows of the prairie all bending their heads gracefully to the northeast.

The relations between trees and the fertility of the country around them is a matter of deep interest to man. Portions of France have been productive and afterwards barren because of the abundance of the trees at first and their having afterwards been cut down to supply the wants of man, who desired their material and the ground on which they stood. The rivers of Michigan are not navigable now in some instances where once they were deep with water. The destruction of the forests to supply the lumber and furniture markets of the world has caused less rain to fall, and the snows of winter which formerly lay late in spring beneath the forests now melt at the return of the sun in the early months and are swept with the rush of high water away to the great lakes. Many of the barren wastes in Palestine and other countries, which in olden times blossomed as the rose, have lost their glory with the destruction of their trees.

Men have learned something of the value of the trees to a fertile country and the science of forestry has arisen, not only to determine the means of growing beautiful and useful trees, but also to court the winds of heaven to drop their fatness upon the soil. In the state of Nebraska 800,000,000 planted trees invite the rain and the state is blessed by the response.

Man used to worship the forest. The stillness and the solemn sounds of the deep woods are uplifting to the soul and healing to the mind. The great gray trunks bearing heavenward their wealth of foliage, the swaying of branches in the breeze, the golden shafts of sunlight that shoot down through the noonday twilight, all tend to rest the mind from the things of human life and lift the thoughts to things divine.

The highest form of architecture prac-

ticed on earth is the Gothic, which holy men devised from contemplation of the lofty archings of trees and perpetuated in the stone buildings erected to God in western Europe through the centuries clustering around the thirteenth.

Trees afford hiding and nesting places for many birds and animals. Their cooling shelter comforts the cattle; they furnish coursing-places among their branches for the sportive climbing-animals, and their tender twigs give restful delight to the little birds far out of reach of any foe.

Man has always used the trees for house building; his warmth is largely supplied from fires of wood and leaves; from the days when Adam and Eve did their first tailoring with fig leaves, the trees have been levied upon for articles of clothing till now the world is supplied with hats of wood, millions of buttons of the same material are worn, and the wooden shoes of the peasantry of Europe clump gratefully over the ground in acknowledgment of the debt of mankind to the woods.

Weapons of all sorts, in all ages, have been largely of wood. Houses, furniture, troughs, spoons, bowls, plows, and all sorts of implements for making a living have been fashioned by man from timber. Every sort of carriage man ever devised, whether for land or water travel, depended in its origin upon the willing material the trees have offered. Although we now have learned to plow the seas with prow of steel and ride the horseless carriage that has little or no wood about it, yet the very perfection of these has arisen from the employment of wood in countless experiments before the metal thing was invented.

Our daily paper is printed from the successors of Gutenberg's wooden type, upon what seems to be paper, but is in reality the ground-up and whitened pulp of our forest trees. Our food is largely of nuts and fruits presented us by the trees of all climes, which are yet brought to our doors in many instances by wooden sailing-vessels, whose sails are spread on spars from our northern forests.

The baskets of the white man and

the red Indian are made from the materials of the forest. Ash strips are pounded skillfully and readily separate themselves in flat strips suitable for weaving into receptacles for carrying the berries of the forest shades or the products of the soil, whose richness came by reason of the long-standing forests which stood above it and fell into it for centuries.

Whoever has tried to stopper a bottle when no cork was at hand knows something of the value of one sort of trees. He who has lain upon a bed of fever without access to quinine knows more of the debt we owe the generous forests that invite us with their cooling branches and their carpeted, mossy floors. The uses of rubber to city people are almost enough to induce one to remove his hat in reverence to the rubber tree; the esteem we have for the products of the sugar maple and the various products of the pine in their common forms of tar, pitch, and turpentine, as well as in their subtler forms, which are so essential to the arts and sciences, contributing to our ease, comfort, and elegance, should cause us to cherish the lofty pine and the giant maple with warmest gratitude.

Perhaps the most refined of the pleasures of man is found in the playing of musical instruments. There is not one of the sweeter-toned of all the vast family of musical instruments that is not dependent on the sympathetic qualities of the various woods. The violin shows the soul of this material in its highest refinement. No other instrument has so effectually caught the tones of the glorious mountain and the peaceful valley as has the choicely selected and deftly fashioned shell of the fiddle. It awakens all the fancies of a lifetime in one short hour, it brings gladness to the heart and enlivens the whole frame, and when the master hand brings out from its delicate form the deeper secrets of its nature the violin brings tears to our eyes and inspires within us an earnestness of purpose which is a perpetual tribute of the soul of man to the heart of the forest.

I took a spring journey once from

the heart of old Kentucky through some of the northern states around to the eastward to Virginia. The dogwood was in blossom south of the Ohio. The forests and hillsides were set forth here and there in bridal array by the glad whiteness of myriads of these delicate flowers. Through Ohio and Indiana the peach trees were putting forth their delicate pink blossoms that sought us out in the cars and delighted us with their rare fragrance. In Pennsylvania we passed out of the peach region, and I thought the mountains could not give flowers to match the loveliness experienced on the two preceding days, but when we were running adown the "blue Juniata river" there burst upon me the purple radiance of the ironwood that I had entirely forgotten as a flowering tree of beauty. Brighter than the peach and softer than the dogwood it stood out against the foliage of the stream and hillside. It followed the railway all down the Susquehanna across the line into Maryland, and gave me joy until it was lost again as the warmth of the southern sun poured itself again before my eyes upon the purity and simplicity of the snowy dogwood.

And in the fall I once passed through the hills of New York and Massachusetts. It was Thanksgiving Day. The matchless American forests were then in their greatest glory. Every hill seemed to have brought out its choicest holiday garment and was calling for admiration. So richly blended are the reds, the yellows, and the greens that one cannot see how people can do business with such delights for the eye spread out before them. Why they do not come en masse and join in this holiday of the trees is more than I can understand. It seems as if the Creator of heaven and earth had reserved for the home of liberty the most gorgeous colorings that prismatic light is susceptible of bearing, and thrown them all down in luxurious profusion for the delectation of the people who should shake off the man-serving spirit and come here to breathe the air of freedom and rejoice with nature through the ten days of her gorgeous Thanksgiving time.

THE CINERARIA.

PROF. WILLIAM K. HIGLEY,
Secretary Chicago Academy of Sciences.

IN THE early days of the Columbian Exposition, before people had ceased to wonder at the unexpected and unusual sights, there were beautiful displays of plants in flower, on a scale never before attempted, at least in this part of the world.

Those wise enough to respond to the invitation to visit the long, low green houses in Jackson Park, before the more pretentious Horticultural Building was ready for use, will never forget the royal mass of blossoms which greeted their eyes as they passed through long aisles of bloom.

The announcement that the cineraria was on exhibition meant little to many, but to those who found their way to the park during the chilly spring days and patiently trudged over unfinished paths, and through rubbish and incompleteness, the announcement opened the door to a sight so wonderfully fine and complete, so astonishing, and so delightful, that to look was to exclaim and admire, and to admire was to remember, and, months after, to long for another sight of that billowy mass of pinky-purplish bloom.

The Compositæ, the family of plants to which the cinerarias belong, contains about seven hundred and sixty genera and over ten thousand species, embracing approximately one-tenth of all the flowering forms. This is the largest family of plants and includes the goldenrod, the sunflower, the aster, the chrysanthemum, the thistle, the lettuce, the dandelion, and many others. The species are widely distributed, though more common in temperate or

hot regions, the largest number being found in the Americas.

Though a family of herbs, there are a few shrubs and in the tropics a small number of trees. The cultivated forms are numerous, and some are among our most beautiful fall plants.

The flowers are collected together in heads, and sometimes are of two kinds (composite). Using the sunflower for an example we find a disk of tubular flowers in the center and, growing around it, a row of strap-shaped flowers, while in the dandelion they are all strap-shaped, and in some other species all are tubular.

The cineraria is an excellent illustration of the composite form, which bears both kinds of flowers.

The name cineraria (Latin, *cinerarius*, from *cinis*, ashes) was given to these plants because of the grayish down that covers the surface of the leaves.

The cinerarias form a large genus of practically herbaceous plants, and are chiefly natives of southern Africa and southern and eastern Europe. The varieties vary greatly from white to pinkish-purple and through various shades to dark, bluish-purple.

They are quite easily cultivated, but are house plants in temperate latitudes. They are peculiarly liable to attacks of insects, plant-lice (*Aphides*) being especially an enemy.

The florist's varieties are chiefly produced from the species *Cineraria cruenta*. Beautiful hybrids have been developed from this and other species, and the flower certainly deserves the popularity it has attained through sterling merit.

INDEX.

VOLUME V.—JANUARY, 1899, TO MAY, 1899, INCLUSIVE.

ACORNS , Two.....	210
Animals, Among.....	185
Animals, Hibernation of.....	84
Arbutus, The Trailing.....	229
Athena, The Birth of.....	29
Azalea, The.....	143
BABOON (<i>Cynocephalus babuin</i>).....	217
Bat, The Hoary (<i>Atalapha cinerea</i>).....	166
Bees, About.....	17
Birds, Defense of Some.....	211
Birds, Migratory.....	37
Birds that Do Not Sing.....	188
Bird Life, Destruction of.....	109
Birds as Shepherds	20
Bluebird, The.....	181
Boarder, A Transient.....	101
Bread Crumbs, The Charity of.....	115
Busybodies, Little.....	113
Butternut, The (<i>Juglans cinerea</i>).....	96
CINERARIA	236
Cloves (<i>Eugenia caryophyllata</i> Thunberg).....	121
Cocoa-nut (<i>Cocos nucifera</i>).....	95
Coffee.....	197
Cony, The (<i>Hyrax</i>).....	203
Crusade, The Feather.....	221
DESERT , The Ship of the.....	37
EAGLE , The.....	24 and 36
Egg Collecting.....	216
FASHIONS , Spring.....	186
Feathers	161
February	73
Flowers, The Language of.....	74
Fox, The Kit (<i>Vulpes velox</i>).....	182
GINGER (<i>Zingiber Officinale</i> Roscoe).....	49
God's Silence and His Voices Also.....	222
Grape, The.....	178
Gull, Bonaparte's (<i>Larus philadelphia</i>).....	215
HARE , Epitaph of a.....	98
Hare, The Northern Prairie (<i>Lepus campestris</i>).....	106
Helpless, The.....	72
Holly Tree, The.....	12
Home, An Abandoned.....	150 and 198
Humor, A Vein of.....	125
Hyacinth, The (<i>Hyacinthus orientalis</i>).....	191
IBIS , The White (<i>Guara alba</i>).....	71
Iris, The (<i>Iris versicolor</i>).....	74
KANGAROO , The.....	157
LEMON , The.....	13
Little Billee, The Story of.....	41

MERGANSEr, The Hooded (<i>Lophodytes cucullatus</i>).....	118
Mistletoe, The (<i>Phoradendron flavescens</i>).....	22
Mole, Common American (<i>Scalops aquaticus</i>).....	133
Mole, The Duck	80
Mole, The Hairy-tailed (<i>Scapanus breweri</i>).....	230
Mountain Lion (<i>Felis Concolor</i>).....	10
NATURE at First Hand.....	175
Noses	65
Nutmeg, The (<i>Myristica fragrans Hanthey</i> \.....	145
Nuts.....	26
OAK, The	134
Opossum, The Crab-eating (<i>Philander philander</i>).....	59
Owl, The American Barn (<i>Strix pratincola</i>)	155
Owls	78
Owls' Sanctuary, The	223
PEACOCK, The.....	77
Pine, The Edible	96
Pineapple, The (<i>Ananassa sativa</i>)	110
Pool, The Summer.....	218
Pokagon, Chief Simon	173
Preacher Bird, The	194
Puma (<i>Felis concolor</i>)	10
QUADRILLE, The Quails'	176
Quarrel between Jenny Wren and the Flycatchers	192
REDBREAST, Invitation to the.....	158
SANDHILL CRANE, The (<i>Grus Mexicana</i>)	46
Sap Action	54
Seeds, How Birds Carry	37
Skin.....	137
Snapping Turtle, The (<i>Chelydra serpentina</i>)	38
Snowflakes	89
Spring, The Coming of.....	168
Springtime, A.....	156
Study, A Window	90
Squirrel's Use of His Tail	103
TARSIER, The.....	228
Tess (<i>Simia troglodytes</i>).....	1
Thrush, The Water (<i>Seiurus novebora censis</i>).....	227
Tongues.....	5
Trees.....	233
Trumpeters, The	120
Tufted Titmouse, The (<i>Parus bicolor</i>)....	97
Turgenief, Prose Poems of Iyan.....	180
Turtle, The Geographic (<i>Malacoclemmys geographicus</i>)	62
VULTURES, Vision and Scent of.....	163
WALNUT, The Black (<i>Juglans Nigra</i>).....	96
Warning, A Timely.....	89
Washington and Lincoln.....	60
Warbler, The Nashville (<i>Helminthophila rubricapella</i>).....	169
Warbler, The Cape May (<i>Dendroica tigrina</i>).....	86
Wax Wing, Cedar (<i>Ampelis cedrorum</i>).....	193
Whippoorwill.....	2 and 34
Wild Animals, Taming the Smaller.....	127
Woodchuck, The (<i>Arctomys monax</i>).....	130
Woodmen, Five Little.....	91
Woodpecker Story, Emerson and the.....	56



W-571

